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STUDIES IN THE LAURACEAE, VI
PRELIMINARY SURVEY OF THE MEXICAN AND
CENTRAL AMERICAN SPECIES

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Concluded from page 364

4. *Nectandra* Rolander

Nectandra Rolander ex Rottboell in Act. Univ. Hafn. 1: 267. 1778; Grisebach, Fl. Brit. W. Ind. 281. 1860; Meissner in DC. Prodr. 15¹: 146. 1864; Hemsley, Biol. Centr. Am. Bot. 3: 74. 1882; Mez in Jahrb. Bot. Gart. Berlin 5: 393. 1889.

DISTRIBUTION: Tropics of America, the bulk of the species occurring in South America, particularly in the Andes, with about 38 in Central America and Mexico, and a few in the West Indies, the fringe of the latter just touching the mainland of Florida.

The genus consists of trees or shrubs with various types of glabrous or pubescent foliage. The alternate leaves have blades that are membranaceous to rigidly coriaceous, lanceolate, elliptic, or obovate, often with variously expanded and recurved leaf-bases. The blades are usually penninerved, rarely subtriplinerved, the reticulation being obscure to extremely conspicuous. Pubescent axillary glands are frequently conspicuous on the lower surface. The inflorescences are usually paniculate, axillary or subterminal, with peduncles of varying length, the bracts deciduous, with the pubescence variable. The flowers are always perfect in the species found in this area. The tube may be conspicuous or almost entirely lacking. The equal lobes are lanceolate to elliptic, ovate or occasionally obovate, usually fleshy and papillose, occasionally membranaceous, almost always spreading or reflexed at anthesis, and usually deciduous. The stamens of the outer series are either fleshy, petaloid, papillose, and ovate, or quadrate or orbicular, with conspicuous connective-tissue, or they are reniform or subreniform, frequently emarginate, with no apparent connective tissue, the cells occupying the entire anther. The four cells are always introrse and usually are arranged in an arc-like formation, very rarely this arc is obscure. The anthers are sessile or borne on filaments of varying length and thickness, often pubescent, particularly at the base. The stamens of the third or inner series are usually quadrate;

in the flowers bearing the petaloid outer series, the inner also may be fleshy and papillose, with truncate connectives; in other cases, they are not fleshy or papillose and the connectives are inconspicuous. The four cells are arranged in two horizontal planes; those of the upper plane are lateral or laterally extrorse; those of the lower plane are usually extrorse. The staminodia when present are for the most part stipe-like; occasionally they bear well developed heads of varying shape. The gynaecium is, except in a very few instances, completely glabrous, the ovary globose or depressed-globose, rarely ellipsoid or ovoid. The style is usually short, but occasionally may be even the length of the ovary, and bears a discoid or triangular or occasionally a peltate conspicuous stigma. The fruit is ellipsoid, globose, or oblong, borne in a more or less shallow usually woody cupule formed by the enlarged perianth-tube usually with simple margin, occasionally bearing the remnants of the perianth-lobes. This is uniformly subtended by an enlarged pedicel.

KEY TO THE SPECIES OF NECTANDRA

- A. Leaf-blades not recurved at all at the base, or decurrent, not auriculate or cordate or even rounded at the base generally.
 - B. Largest leaf-blades never more than 9 cm. long.
 - C. Largest leaf-blades up to 7 cm. long and 2 cm. broad, lanceolate-elliptic, varnished-shining above, the reticulation somewhat obscure...1. *N. Davidsoniana*.
 - C. Largest leaf-blades up to 9 cm. long and 3.5 cm. broad, elliptic, not varnished-shining above, the reticulation very conspicuous.....2. *N. Smithii*.
 - B. Largest leaf-blades never less than 10 cm. long.
 - C. Anthers of the two outer series of stamens fleshy, petaloid, papillose, never emarginate, the upper third consisting of connective tissue, the remaining space occupied by the cells.
 - D. Anthers of two outer series ovate or quadrate, the cells not forming a perfect arc; leaves membranaceous.
 - E. Anthers of the two outer series definitely ovate; largest leaf-blades not more than 14 (usually 12) cm. long; lateral nerves 4 or 5 pairs.....3. *N. Brenesii*.
 - E. Anthers of the two outer series definitely quadrate; largest leaf-blades not less than 15 (up to 26) cm. long; lateral nerves 7-12 pairs.
 - F. Leaf-blades shining above, densely and prominently reticulate throughout, elliptic, the base cuneate.....4. *N. ambigens*.
 - F. Leaf-blades somewhat shining above, with loose very obscure reticulation throughout, elliptic, oblong-elliptic or ovate-elliptic, the base roundish or obtuse usually.....5. *N. rubriflora*.
 - D. Anthers of two outer series ovate-orbicular or suborbicular, the cells forming a perfect arc; leaves not membranaceous.
 - E. Young branchlets, lower surface of leaf-blades, and inflorescence densely and conspicuously ferruginous-tomentose; leaf-blades elliptic.....6. *N. Schippii*.
 - E. Young branchlets, lower surface of leaf-blades, and inflorescence not densely and conspicuously ferruginous-tomentose.
 - F. Young branchlets, young leaves, and inflorescence densely fulvous- or brownish-tomentose; blades obovate; anthers of two outer series truncate; cupule hemispherical.....7. *N. Austinii*.
 - F. Young branchlets, young leaves, and inflorescence not densely fulvous- or brownish-tomentose; blades not obovate; anthers of two outer series not truncate; cupule cyathiform.

- G. Leaf-blades pale green, usually with the venation and reticulation showing whitish, often with large ellipsoid axillary pubescent glands on the lower surface, but conspicuous on both surfaces.....8. *N. panamensis*.
- G. Leaf-blades not pale green with conspicuous whitish venation and reticulation; axillary glands if present rather inconspicuous.
- H. Leaf-blades with lateral nerves 8-12 pairs.....9. *N. globosa*.
- H. Leaf-blades with lateral nerves 4-6 (-7) pairs.....10. *N. ramonensis*.
- C. Anthers of two outer series of stamens not fleshy, petaloid, or papillose, but quadrate or reniform, subreniform, or suborbicular, and frequently emarginate, the cells occupying the entire anther.
- D. Anthers quadrate, sometimes apiculate.....11. *N. Heydeana*.
- D. Anthers reniform or subreniform or suborbicular.
- E. Greatest width of leaf-blades at and below the middle, the blade tapering only toward the apex.....12. *N. Gentlei*.
- E. Greatest width of leaf-blades exactly at the middle, the blade tapering toward the base and the apex equally or the leaf-blades obovate.
- F. Largest leaf-blades not less than 7 cm. broad.
- G. Pubescence (when present on the young branchlets, lower surface of the leaf, buds, petioles, and inflorescence) predominantly canescent, not sericeous; petioles not longer than 1.5-2 cm.....13. *N. Woodsoniana*.
- G. Pubescence (when present on young branchlets, leaf-buds, petioles, and inflorescence) fulvous-sericeous; petioles to 3 cm. long; flowers white and fragrant.....14. *N. Lundellii*.
- F. Largest leaf-blades not more than 6.5 cm. broad, usually 5 cm., rarely 8 cm.
- G. Lateral nerves 3-5 (-6) pairs; leaf-blades often subtriplinerved.
- H. Leaf-blades subtriplinerved, not more than 11.5 cm. long, usually less, the apex long-acuminate.....15. *N. savannarum*.
- H. Leaf-blades not subtriplinerved, 12-14 cm. long, the apex long-caudate.....16. *N. longicaudata*.
- G. Lateral nerves not less than 6 pairs, usually 7-9.
- H. Inflorescence usually glabrous; leaf-blades usually lanceolate-elliptic, 11-14 (-20) cm. long and 5 (-6.5) cm. broad.
- I. Leaf-blades not caudate at the apex.
- J. Leaf-blades always lanceolate-elliptic, not more than 2-3.5 cm. broad, always long-acuminate at the apex; reticulation prominent on the lower surface of the blades.
- K. Leaf-blades glaucous above, reddish green beneath; fruit 10 × 6 mm.; cupule verruculose.....17. *N. nervosa*.
- K. Leaf-blades grayish green throughout, or brownish, paler beneath; fruit 20 × 18 mm.; cupule not verruculose.....18. *N. salicina*.
- J. Leaf-blades usually elliptic or lanceolate-elliptic, not less than 4 cm. broad, the apex variable; reticulation prominent throughout.
- K. Leaf-blades coriaceous and pale, the reticulation obscuring lateral nerves on the upper surface.....19. *N. coriacea*.
- K. Leaf-blades chartaceous, brownish or green, the reticulation not obscuring lateral nerves on the upper surface.....20. *N. salicifolia*.

- I. Leaf-blades caudate at the apex.....21. *N. fuscobarbata*.
 - H. Inflorescence variously pubescent.
 - I. Young branchlets golden- or ferruginous-sericeous or subferruginous-tomentose.
 - J. Reticulation scarcely apparent on upper surface of leaf-blades.
 - K. Leaf-blades chartaceous; axillary glands absent; young branchlets and young leaf-blades golden-“glittering”-tomentose.....22. *N. nitida*.
 - K. Leaf-blades coriaceous; axillary glands conspicuously pubescent; young branchlets and young leaves subferruginous-tomentose...23. *N. perdubia*.
 - J. Reticulation exceedingly prominent throughout.
 - K. Leaf-blades oblong-elliptic, caudate-acuminate; fruit globose.....24. *N. latifolia*.
 - K. Leaf-blades elliptic, acuminate; fruit ovoid-ellipsoid.....25. *N. Cufodontisii*.
 - I. Young branchlets not golden- or ferruginous-sericeous or subferruginous-tomentose, sometimes glabrous.
 - J. Inflorescence and branchlets grayish- or fulvous-sericeous.....26. *N. tabascensis*.
 - J. Inflorescence shortly pilose; branchlets glabrous.....27. *N. Loeseneri*.
- A. Leaf-blades recurved at the base and decurrent, or auriculate and recurved, or cordate and recurved.
 - B. Base of leaf-blades decurrent and recurved, not auriculate.
 - C. Largest leaf-blades about 20–22 cm. long, membranaceous or coriaceous.
 - D. Lateral nerves 8–12 pairs; petiole not thickened.....8. *N. globosa*.
 - D. Lateral nerves 4–6 pairs; petiole less than 1 cm. long, only slightly thickened.
 - E. Leaf-blades not more than 4.5 cm. broad; blades narrowly ovate-lanceolate, attenuately acuminate at the apex.....12. *N. Gentlei*.
 - E. Leaf-blades not less than 5 cm. broad; blades oblong-elliptic, abruptly obtusely acuminate at the apex.....28. *N. Skutchii*.
 - C. Largest leaf-blades not more than 17 (–18) cm., usually less than 15 cm., long, coriaceous, subcoriaceous, or chartaceous.
 - D. Branchlets, lower leaf-surface, and inflorescence densely woolly ferruginous-tomentose.....6. *N. Schippii*.
 - D. Branchlets, lower leaf-surface, and inflorescence not densely woolly ferruginous-tomentose.
 - E. Petioles not thickened; leaf-blades only slightly decurrent at the base and very slightly recurved for less than 5 mm.
 - F. Anthers more or less ovate, obtuse, with fleshy papillose connectives; fruit ellipsoid.....9. *N. ramonensis*.
 - F. Anthers subreniform, submarginate; fruit globose..29. *N. Standleyi*.
 - E. Petioles variously thickened; leaf-blades conspicuously decurrent and recurved at the base up to 4–5 cm.
 - F. Largest leaf-blades not more than 5.5, usually 4, cm. broad.
 - G. Base of leaf-blades narrowed and recurved, making an apparent petiole 4–5 cm. long.....30. *N. producta*.
 - G. Base of leaf-blades narrowed and recurved into an apparent petiole not more than 3 cm. long at most.....31. *N. Whitei*.
 - F. Largest leaf-blades not less than 5, usually more than 6, cm. broad.
 - G. Leaf-blades usually shining above and heavily reticulate; anthers ovate and acutish, the connective tissue comprising the upper quarter of the anthers; stigma borne on a well defined style; cupule and pedicel 2.5 cm. long.....32. *N. hypoglauca*.

- G. Leaf-blades not shining, inconspicuously reticulate above; anthers subreniform, the cells occupying the entire anther; stigma sessile.....33. *N. Paulii*.
- B. Base of leaf-blades cordate or rounded, conspicuously or sometimes slightly recurved as well, never decurrent.
- C. Leaf-blades oblong-lanceolate or elliptic, rounded, or subcordate; young branchlets and inflorescence, if pubescent, ferruginous- or subferruginous-tomentose.
- D. Leaf-blades chartaceous, subferruginous-tomentose beneath, the surface not prominently reticulate; inflorescence softly and loosely subferruginous-tomentose.....34. *N. belizensis*.
- D. Leaf-blades rigidly coriaceous, glabrous throughout, prominently reticulate above and shining; inflorescence glabrous.....35. *N. rudis*.
- C. Leaf-blades obovate to obovate-oblong, cordate or at least rounded, not recurved usually; pubescence of branchlets and inflorescence never ferruginous-tomentose, but tawny, if present at all.
- D. Leaf-blades membranaceous, glabrous or glabrescent beneath at most.....36. *N. platyphylla*.
- D. Leaf-blades coriaceous or subcoriaceous, tawny-tomentose beneath; fruit densely pubescent on lower half.....37. *N. sinuata*.
- B. Base of leaf-blades definitely auriculate and recurved, the recurved auricles often overlapping conspicuously beneath.....38. *N. reticulata*.

1. *Nectandra Davidsoniana*, sp. nov.

Arbor, ramulis foliosis fulvo-sericeo-pubescentibus celerrime glabrescentibus mox glabris, ramulorum cortice revera colore rubescenti-brunneo epidermate tenuissimo secedibili griseo velato. Folia alternata, petiolis gracilibus canaliculatis ad 8 mm. longis, laminis utrinque glabris membranaceis, supra lucidis, in sicco viridescentibus vel brunneis subtus pallidioribus, lanceolatis vel elliptico-lanceolatis, 5-6 (-7) cm. longis et 13-17 (-22) mm. latis, basi cuneatis, apice obtusis vel obtuse acuminatis, penninerviis, costa supra inconspicua subtus leviter elevata, nervis plerumque 4-paribus supra obscuris subtus leviter elevatis angulo 35-45° divergentibus, rete venularum supra inconspicuissimo subtus haud conspicuo. Inflorescentia parva gracilis axillaris inconspicua, depauperata paniculata, glaberrima, pauciflora (ad 5-flora), pedunculo gracili glabro ad 2 mm. longo. Flores ad 4 mm. longi, pedicellis ad 3 mm. longis gracilibus, perianthio campanulato gilvo, lobis ± 2.8 mm. longis, membranaceis papillois; staminibus ser. I & II ± 1 mm. longis antheris oblongo-globosis, filamentis gracili triplo longioribus, ser. III ± 1.25 mm. longis, antheris oblongis biglandulosis, glandulis brevistipitatis antheris et filamentis aequalibus; staminodiis triangularibus pubescentibus ± 0.6 mm. longis; gynaecio glabro ± 1.5 mm. longo, ovario ovoideo stipite triplo longiore, stylo duplo longiore, stigmate discoideo conspicuo. Fructus ignotus, niger, fide coll., receptaculo rubro, fide coll., glabro, hypocrateriformi, disco plano 1 cm. diam. subtentus, pedicello subverruculoso, ad 1 mm. longo et utrinque 4 mm. lato, margine integro.

DISTRIBUTION: Known only from the type-locality.

PANAMA: Chiriquí: Chiquero, Boquete, alt. 1830 m., April 11, 1938, *M. E. Davidson* 564 (fl., fr., TYPE — A, Ch) (tree; flowers cream; fruits black, with red receptacle).

The new species is somewhat like *N. salicifolia* in aspect, but the leaves are smaller than any known representative of that species. The floral

structure too is not unlike, the greatest divergence being the subglobose anthers of the two outer series, as opposed to the subreniform anthers characteristic of *N. salicifolia* and its allies. The fruit unfortunately is lacking on the specimens of *N. Davidsoniana* found in the herbaria of the Arnold Arboretum and the Chicago Museum, but the cupule is present. According to the collector, the fruit is black, and it is subtended by a red woody cupule that is hypoc crateriform.

2. *Nectandra Smithii*, sp. nov.

Arbor 10–17 m. alta, ramulis foliosis minute subferrugineo-pubescentibus celerrime griseis striatis deinde griseis verruculosis. Folia alternata, petiolis gracilibus glabrescentibus canaliculatis (5–) 7–10 (–12) mm. longis, laminis utrinque glabris, basi costae excepta, membranaceis, in sicco utrinque brunneis, supra nonnihil lucidis, ellipticis, 6–8 cm. longis et 3–4 cm. latis, in petiolum leviter decurrentibus, basi cuneatis raro obtusis, apice acutis vel breviter subcaudato-acuminatis, penninerviis, costa pubescente utrinque conspicua subtus elevata, nervis plerumque 5-paribus supra paulo subtus valde prominulis angulo 35–45° divergentibus, glandulis conspicuis fulvo-pubescentibus in nervorum lateralium axillis, rete venularum utrinque perconspicuo. Inflorescentia axillaris, brevis, paniculata, 2–3 (–5.5) cm. longa, glabrescens, pauciflora, brevipedunculata, pedunculo gracili 1–2 cm. longo. Flores ad 3.5 mm. longi, pedicellis 1.5–2 mm. longis gracilibus, perianthio subcampanulato albo(?) vel gilvo, lobis oblongis obtusis crassis papilloso-tomentosis, 2.5–3 mm. longis; staminibus ser. I & II ± 0.8 mm. longis antheris subreniformibus filamento duplo longioribus, ser. III ± 1.25 mm. longis antheris filamentis conspicue biglandulosis glandulis aequalibus; staminodiis oblanceolatis acutis ± 0.6 mm. longis; gynaecio glabro ± 1.7 mm. longo, ovario late ovoideo, stylo brevi robusto, stigmate triangulari. Fructus niger, subglobosus, minute apiculatus, ad 1 cm. diam., cupula vadosa tumescente ad 4 mm. longa, 6 mm. diam., et 2 mm. alta subtentus, pedicello 4–5 mm. longo apice ad 3 mm. diam. expanso.

DISTRIBUTION: Costa Rica, in the Caribbean cloud-forest at 1600–1700 m. altitude, and in Panama up to 800 m.

COSTA RICA: Alajuela: La Palma de San Ramón, *Brenes 6825* (fl., Ch); Zapote de San Carlos, region of Zarcero, growing at edge of woodland in semi-shade in Caribbean cloud-forest, alt. 1600 m., March 26, 1938, *A. Smith H.541* (fl., TYPE—A, Ch) (tree 10 m. high, base 25 cm.; bark gray, roughened by large well spaced dots, the cambium-layer yellowish; leaves shining; flowers in axillary racemes, the pedicels and round buds pink or red; petals white); La Peña de Zarcero, *A. Smith H.590* (fl., A, Ch). PANAMA: Coclé: Vicinity of El Valle, *P. H. Allen 774* (fr., Ch, GH, Mo). Panama: Residual forest in rolling grassland, trail from Campana to Chica, Cerro Campana, *P. H. Allen 2652* (fr., A).

This species, also, seems to have its affinity with the variable *N. salicifolia*. The foliose branchlets, the consistently few pairs of lateral nerves, and the prominent reticulation of the small leaves set it apart from the well known species. The bulging cupule which fits snugly about the very base of the fruit is another differentiating character.

3. *Nectandra Brenesii* (Standley), comb. nov.

Ocotea Brenesii Standley in Field Mus. Publ. Bot. 18: 454. 1937.

DISTRIBUTION: Known only from Costa Rica.

COSTA RICA: Alajuela: La Palma de San Ramón, *Brenes 5535 (127)* (fl., Ch), woods and pastures; Cataracts of San Ramón, March-April, 1931, *Brenes 13653* (fl., TYPE, Ch); Caribbean cloud-forest, Zapote de San Carlos, region of Zarcero, *A. Smith H.469* (fl., Ch, NY); continental divide, Zarcero, *A. Smith H.516* (fl., Ch), *A.571* (fl., Ch), *4102* (fl., Ch), *4171* (fl., Ch); Suere, San Carlos, Caribbean rain-forest, on edge of ravine, *A. Smith H.1687* (fl., Ch); Tapeseo, Alfaro Ruiz, *A. Smith P.2620* (fl., A); Palmira, in fog-zone, *A. Smith 4202* (fl., Ch). Heredia(?): Vicinity of Vara Blanca, north slope of Central Cordillera, between Poás and Barba volcanoes, *Skutch 3736* (fl., fr., A, NY).

The branchlets of this species are slender, somewhat angled, striate, and early clothed with a close sericeous pubescence varying from buff or tawny to a deeper almost subferruginous color. The leaves have slender grayish-pubescent petioles that are canaliculate and measure up to 12 mm. long. The blades are membranaceous, elliptic, shining above, dull beneath, the base obtuse or almost rounded, the apex acuminate to abruptly obtusely acuminate or subcaudate. They measure up to 8–12 (–14) cm. long and 3.5–6 (–8) cm. broad, and at maturity show a slight close persistent pubescence, sparse on the blade as a whole but dense near the costa and nerves. The costa is impressed above and very prominently elevated beneath. The lateral nerves, of which there are 4 (or 5) pairs, diverging from the costa at an angle of 35–45°, are slightly elevated above and more prominently so beneath, bearing only a slight suggestion of axillary glands. The inflorescence is a short few-flowered cymose panicle, sparsely and inconspicuously pubescent, becoming glabrescent, up to 6 (–8) cm. long, with a slender peduncle up to 4 cm. long. The flowers are large, measuring almost 5 mm. long and 12 mm. in diameter, the tube short, the lobes thick, fleshy, elliptic, up to 4.25 mm. or more long. The two outer series of stamens are ± 1.9 mm. long, with anthers ovate, obtuse, borne on stout filaments one-quarter the length of the stamens. The connective is well developed, about one-third the entire length of the anther. The stamens of the third series are more or less oblong, bearing at the base of the filaments two sprawling somewhat depressed sessile glands that are about the height of the filaments, only wider. The staminodia are ovate, ± 0.8 mm. long, borne on pubescent stipes slightly more than half the entire length. The glabrous gynaecium is ± 2.7 mm. long, the depressed-globose ovary twice the length of the rather stout style which bears a triangular slightly decurrent flat stigma. The only fruiting material cited does not exactly match the remainder of the specimens in foliage-characters. The leaves are shorter, more narrowly elliptic, and are definitely caudate. The fruit is lacking on the specimen, but the subtending cupule (seemingly immature) is smooth, purplish, very shallow, about 7 mm. long and 7–8 mm. in diameter at the apex; the long pedicel is 1.5 cm., smooth and expanding to join the cupule with no visible line of demarcation. The young fruits are very similar to those of *N. savannarum*, but the flowers on the same branch show the characters of *N. Brenesii*.

The same reason may be given for transferring this species from *Ocotea* to *Nectandra* that is offered in the case of the next, *Phoebe ambigens*. I am at a loss to suggest the true affinity of this species.

4. *Nectandra ambigens* (Blake), comb. nov.

Phoebe ambigens Blake in Contr. U. S. Nat. Herb. 24: 3, pl. 2. 1922; Record in Trop. Woods 10: 21. 1927; Standley in Trop. Woods 21: 719. 1930.

DISTRIBUTION: Eastern Guatemala and Honduras.

GUATEMALA: Without locality, *Kuylen G.54 (1)* (Y 8885) (sterile, Y); Hopi Farm, *Kuylen G.149* (Y 10508) (fl., NY, Y). Izabal: Las Playitas, *Whitford & Stadtmiller 32* (sterile, GH). San Marcos: Finca El Porvenir, on Potrero Matasán along Río Cabús, Volcán Tajumulco, *Steyermark 37643* (fr., Ch). HONDURAS: Copán: Rodezno, *Whitford & Stadtmiller 7* (fl., ISOTYPE, GH, Y). Colón(?): El Limón, *Whitford & Stadtmiller 26* (sterile, Y).

NATIVE NAMES: "Aguacatillo" (Guatemala); "Ajio," "Guambo" (Honduras).

This species has branchlets that are finely and sparsely grayish-pubescent, becoming glabrous, and angled, becoming grayish-striate. The leaves have stout petioles 2 (-2.8) cm. long and sparsely pubescent to glabrescent. The blades are subcoriaceous, shining above and beneath, usually elliptic, cuneate at the base, obtuse or shortly obtusely acuminate, 9.5-26 cm. long and 3.5-10 cm. broad. The thick costa and lateral nerves, of which there are 7 or 8 (-9) pairs diverging at an angle of about 45°, are slightly elevated above and more so beneath. Blake mentions axillary tufts being frequently present, but on the material at hand they are almost imperceptible. The dense and prominent reticulation on both surfaces of the leaf is one of the most striking characteristics of the species. The glabrescent inflorescence is axillary, few-flowered, up to 15 cm. long, the stout peduncle up to 7.5 cm. long. The most arresting feature of the species is the presence of large flowers up to about 8 mm. long and 15 mm. in diameter at anthesis, densely grayish-pubescent without, the spreading lobes bright-castaneous at anthesis, and subtended by a slender pubescent pedicel up to 9 mm. in length. The tube is short, the lobes broadly elliptic, up to 7 mm. long and about 5 mm. broad, fleshy and papillose within. The stamens of the two outer series are ± 2.5 mm. long, the almost quadrate anthers are rounded at the apex and nearly sessile. Those of the inner series measure nearly 3 mm. long, the anthers square, truncate at the apex, the filaments nearly half the entire length and bearing near the base two conspicuous subglobose sessile glands. The staminodia are ovate, subsessile (in the type), and ± 1.25 mm. long. The glabrous gynaecium is ± 2.15 mm. or more long, the depressed-globose ovary equalling in length the stout style topped by a broad conspicuous subtriangular decurrent stigma. The Steyermark specimen from Guatemala shows a large fruit which is green (probably not fully ripe), ellipsoid, apiculate, the entire apex conspicuously smooth, 2.5 (-3) cm. long and 1.7 cm. broad, subtended by a sharply lobed woody verrucose cupule 1 cm. long, over 2 cm. in diameter, and 8-9 mm. deep. The enlarged pedicel is 1.5 cm. long, expanded to nearly 1 cm. diameter at the apex.

Kuylen G. 149, from Guatemala, shows staminodia that are more stipitate than those of the type, but in other respects it matches the type-material. In spite of the presence of staminodia, the other characters of the flower indicate that *Nectandra* is the genus to which the entity belongs. The large flower recalls that of *N. globosa*, but the anthers have a less developed connective, and the style is longer. Also the foliage-characters are entirely different.

5. *Nectandra rubriflora* (Mez), comb. nov.

Ocotea rubriflora Mez in Jahrb. Bot. Gart. Berlin 5: 279. 1889; Standley in Contr. U. S. Nat. Herb. 23: 296. 1922.

Ocotea perseifolia Mez & J. D. Smith in Bot. Gaz. 20: 10. 1895; Standley in l. c.

Ocotea persicifolia Mez & J. D. Smith, in Index Kewensis, Suppl. I. 1906, sphalm.

DISTRIBUTION: Eastern Mexico, Guatemala, and British Honduras, at low altitudes, from 20 to 60 m.

MEXICO: Oaxaca: Chiltepec and vicinity, Tuxtepec, in llanos, *Martínez-Calderón* 49, 469 (fl., A). Tabasco: Teapa, *Linden* in 1840 (fl., photo. of TYPE of *Ocotea rubriflora*, Ch); San Sebastian, *Roviroso* 475 (fl., Ch). GUATEMALA: Izabal: Izabal, alt. 36 m., April, 1889, *J. D. Smith* 1807 (fl., isotype of *Ocotea perseifolia*, US). BRITISH HONDURAS: Stann Creek: Middlesex, along river-bank, *Schipp* 381 (fl., Ch, GH, NY).

This species has branchlets that are angled and clothed with a close short pubescence which verges on a ferruginous shade, or perhaps more tan. The leaves are borne on petioles up to 3 cm. long, canaliculate and glabrescent. The blades are chartaceous to subcoriaceous, broadly elliptic or oblong-elliptic, roundish to obtuse or even cuneate at the base, acuminate to shortly acuminate or subcaudate at the apex, up to 26 cm. long and up to 12 cm. broad, shining above, glabrous or very minutely and inconspicuously pubescent beneath, greenish brown throughout in the dried state. The costa is conspicuous though impressed above, frequently slightly pubescent toward the base on both surfaces, and very prominently elevated beneath. The 10–12 pairs of lateral nerves are often reddish, only slightly elevated above but more so beneath, and diverge from the costa at an angle of about 45° or occasionally 60°. The reticulation of the blade is loose, prominent above and beneath. The inflorescence consists of axillary or subterminal panicles 9 (–15) cm. long, clothed with the same minute pubescence that covers the branchlets, and borne on a stout peduncle 4 (–9) cm. in length. The flowers, usually with a reddish tinge, are large, up to 4.5 mm. in length and 8–9 mm. in diameter, the ovate obtuse perianth-lobes fleshy and papillose, ± 3 –3.8 mm. long. The stamens are ± 1.25 mm. long, and the anthers are thick, papillose, square or parabolical, with the apex often emarginate, borne on stout very short filaments pubescent at the base. The filaments of the inner series of stamens bear at the base sessile glands, which are seemingly compressed-subreniform or subglobose. No staminodia are present. The glabrous gynaecium is ± 1.7 (–2.15) mm. long, the ellipsoid or subglobose ovary topped by a very short stout style with a subcapitate stigma at its apex. No fruit is known.

The species resembles superficially *N. Lundellii*. The flowers of *N. rubriflora*, as the name indicates, are usually reddish, whereas those of *N. Lundellii* are white and, the collectors note, very fragrant. The squarish stamens — more or less petaloid and densely papillose — present a further distinguishing character.

6. *Nectandra Schippii*, sp. nov.

Arbor 10.5 m. alta, ramis griseis glabris, ramulis dense ferrugineo-tomentosis. Folia alternata subverticillata, juventute utrinque ferrugineo-tomentosa, petiolis robustis ferrugineo-tomentosis, ad 5–10 (–15) mm. longis et 2.5 mm. latis, laminis supra glabris costa et nervis exceptis, subtus ferrugineo-tomentosis, coriaceis, in sicco viridescenti-brunneis, ellipticis, (6–) 12–14 cm. longis et (2.5–) 5 (–6) cm. latis, basi acutis, rotundatis, vel subcordatis, apice subobtusis vel rotundatis et emarginatis, saepe longe vel abrupte acuto-acuminatis, penninerviis, costa supra satis impressa et pubescente, subtus conspicuissime elevata et ferrugineo-tomentosa, nervis (6–) 8- vel 9-paribus supra impressis subtus elevatis et pubescentibus, angulo 45°

divergentibus, rete venularum supra satis impresso subtus elevato et pubescente. Inflorescentia axillaris, juvenili bracteis adhuc onusta, ad 6.5 cm. longa, ferrugineo-tomentosa, cymoso-paniculata, pauciflora, longipedunculata, pedunculo ad 4.5 cm. longo. Flores leviter fragrantés, immaturi, pedicellis brevibus pubescentibus, perianthio albo, lobis crassis, papilloso-tomentosis; staminibus ser. I & II subreniformibus apice rotundatis filamentis crassis et latis brevibus, ser. III subreniformibus biglandulosis, glandulis magnis sessilibus antheris aequalibus; staminodiis brevistipitatis bene conspicuis; gynaecio glabro, ovario stylo duplo longiore, stigmate parvo inconspicuo. Fructus ignotus.

DISTRIBUTION: Known only from the type-locality.

BRITISH HONDURAS: Stann Creek: Rare in dense shade on bank along Big Creek, alt. 30 m., Dec. 3, 1931, *Schipp* 856 (fl., Ch, TYPE—GH, NY) (tree 10.5 m., diam. 23 cm., wood cream-colored, close-grained; flowers white, slightly fragrant).

The flower-structure of this species is very similar to that of *N. globosa*. The branchlets, however, with their dense conspicuous woolly covering of ferruginous-tomentose pubescence, differ widely. The bright tomentum after a period wears off to a thin rather straggling layer of grayish inconspicuous pubescence that dwindles to a mere glabrescent state. The fragrant flowers resemble those of *N. globosa*.

7. *Nectandra Austinii*, sp. nov.

Arbor 7.5–13 m. alta, ramulis valde sulcatis fulvo- vel pallide brunneo-tomentosis. Folia alternata, juventute utrinque dense fulvo-tomentosa vel brunneo-tomentosa, petiolis robustis tomentosis canaliculatis, 1–2 cm. longis et ad 4 mm. latis, laminis supra glabris basi costae excepta, subtus hinc inde consperso-pubescentibus nervatione dense fulvo-pubescentibus, coriaceis, in sicco supra pallide olivaceis, subtus atro-brunnescentibus, obovatis, 13 (–22) cm. longis et 7 (–12.5) cm. latis, basi cuneatis saepe obliquis, interdum obtusis, apice rotundatis vel obtusis vel leviter breviterque obtuse acuminatis, penninerviis, costa supra leviter impressa subtus leviter elevata, nervis plerumque 7-paribus supra leviter impressis subtus leviter elevatis angulo (35–) 45 (–55)° divergentibus, rete venularum supra obscuro subtus conspicuo atrato-pubescente delineato. Inflorescentia axillaris anguste paniculata, 4–8 cm. longa, dense fulvo-tomentosa, pauciflora, longipedunculata, pedunculo ad 4 cm. longo satis gracili. Flores immaturi, ad 4 mm. longi, glabri, pedicellis brevibus ad 1 mm. longis pubescentibus, gracilibus, perianthio subcampanulato(?), lobis ellipticis nonnihil crassis glabris ± 2.15 mm. longis, staminibus ser. I & II ± 1 mm. longis, antheris subsessilibus, connectivo conspicuo truncato, ser. III ± 1.25 mm. longis, filamentis brevibus biglandulosis, glandulis parvis staminis partem tertiam aequantibus; staminodiis lanceolatis brevibus ± 0.5 mm. longis; gynaecio glabro ± 1.7 mm. longo, ovario ellipsoideo stylo duplo longiore, stigmate conspicuo. Fructus immaturus (?) viridis, oblongus vel oblongo-obovatus, 2.5–4 (fide coll.) \times 1–1.5 cm., cupula hemisphaerica rubra rugosula glabra, ad 1 cm. longa et diam. et ad 5 mm. alta subtentus, pedicello incrassato glabro aciculato, ad 7 mm. longo et ad 3 mm. lato.

DISTRIBUTION: Known only from the cloud-forests of Alajuela in Costa Rica, at an altitude of 1600–2345 m.

COSTA RICA: Alajuela: Alfaro Ruiz, La Peña, *A. Smith* P.2114 (fl., A); Tapeseo,

in mold and loam in half-shade in Caribbean cloud-forest, alt. 1650 m., Jan. 6, 1940 *Austin Smith P.2226* (fl., TYPE, A) (tree 11 m., trunk base 38 cm.; bark neutral-brown with raised dots; crown broad; leaves chartaceous, thickened, subrigid, opaque green, paler below with fine reticulation; drupe green, fig-form); region of Zarcero, *A. Smith A.240* (fr., Ch).

The new species superficially has characters in common with *N. sinuata*, but the flowers are smaller and more delicate, with their anthers truncate and the ovary glabrous; the leaf-blades are less densely tomentose and their bases are not cordate or conspicuously rounded.

8. *Nectandra panamensis* Mez in Jahrb. Bot. Gart. Berlin 5: 443. 1889.

DISTRIBUTION: Central part of Panama, at 30–100 m. altitude.

PANAMA: Canal Zone: Near Gorgona and Maume, *Wagner s.n.* (fl., photo. of TYPE, GH); Darién, *MacBride 2703* (fr., Ch, Mo). Panama: Around Alhajuela, Chagres Valley, forests, on dry limestone, *Pittier 2398* (fl., Ch, GH, NY); vicinity of Pacora, *P. H. Allen 1126* (fl., Ch, GH, Mo), *2033* (fl., A).

The branchlets of this species are glabrous with only a faint suspicion of pubescence at the apex, greenish, becoming brownish, angled, becoming terete and striate. The leaves have glabrous canaliculate petioles up to 1 cm. long. The blades are membranaceous or chartaceous, pale greenish in the dried state, glabrous, narrowly elliptic or elliptic-lanceolate, the base cuneate, the apex acutish or subacuminate or often obtusely long-acuminate, 15–20 cm. long and not more than 5.5 cm. broad. The costa is plane above, though conspicuous because of its yellowish color, and is elevated beneath. The lateral nerves, of which there are 5–7 (–9) pairs, are yellowish and slightly elevated above but more conspicuously so beneath, diverging at an angle of 25–35 (–45)° and usually bearing in their axils very conspicuous large ellipsoid pubescent glands which are conspicuous on the upper surface of the blade as well. The glabrescent paniculate axillary or subterminal inflorescence is up to 12 (–19) cm. long, much-branched near the base, with a very short peduncle. The white flowers are pubescent, and measure about 3.5 mm. long and up to 8 mm. in diameter, the slender pedicel up to 4 (–6, according to the author) mm. long. The perianth-lobes are fleshy, hairy, and up to 3 mm. long. The two outer series of stamens are ± 0.8 mm. long, the anthers are broadly ovate, obtuse or somewhat depressed-globose, the connective tissue is apparent, and the filaments are very short and thick. The stamens of the inner series are ± 1.25 mm. long and consist of subrectangular anthers that are broader than long and borne on rather stout filaments with two conspicuous sessile basal glands that are almost larger than the anthers themselves. The staminodia are very thin, ovate, ± 0.6 mm. long, the stipe about equalling half the entire length. The glabrous gynaecium is ± 1.7 mm. long, the ovary ellipsoid with a very short stout style topped by a conspicuous triangular stigma. The fruit (probably immature) is borne in a cyathiform cupule up to 6 mm. long, 9 mm. in diameter, and 4 mm. deep. The supporting pedicel is up to 5 mm. long and scarcely broader at the apex than at the base.

The species is reminiscent of *N. Gentlei*, also to be found in this area. The leaf-shape, however, and the type of venation distinguish it from the above-mentioned species. There are points of difference between the species-description and the specimens cited, but I can find no major features which bar the numbers from inclusion in Mez' species.

9. *Nectandra globosa* (Aublet) Mez in Jahrb. Bot. Gart. Berlin 5: 415. 1889, excl. syn. *Laurus globosa* Aublet, Pl. Guian. 1: 364. 1775.

Sassafridium macrophyllum Rose in Contr. U. S. Nat. Herb. 1: 355. 1895.

DISTRIBUTION: West Indies, Mexico, and Central America.

MEXICO: Sinaloa: San Ignacio, Arroyo del Agua Colgada, *Ortega* 715 (fl., Ch). Nayarit (Tepic): Santiago, *Lamb* 614 (fl., GH). Colima: Manzanillo, *E. Palmer* 1033 (fl., isotype of *Sassafridium macrophyllum*, GH, NY). Guerrero: Banks of the Río Tecpán, *Langlassé* 740 (fl., GH). Oaxaca: Tuxtepec, Chiltepec, and vicinity, in llanos, *Martínez-Calderón* 292 (fl., A); Pinotepa to Jamiltepec, *Nelson* 2347 (fl., GH); Jamiltepec, *Conzatti* 4404 (fl., NY). GUATEMALA: Without locality, *Brigham* s.n. (fl., GH). Petén: Above El Cambio, along Río Cancuen, between La Concordia and El Cambio, *Steyermark* 45892 (fl., Ch). Alta Verapaz: Cubilgüitz, *von Tuerckheim* 7964 (fl., GH, NY); wet wooded ravine, along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 89878 (fl., Ch), at edge of river, 90010 (fl., Ch). Izabal: Near mouth of Río Polochic, *Maxon & Hay* 3788 (fl., NY), *von Tuerckheim* 1222 (fl., NY). Guatemala: *Aguilar* 499 (fr., Ch). Chimaltenango: Iztapa, *J. R. Johnston* 1169 (fl., Ch). Retalhuleu: In wet thicket, *Standley* 66695 (fl., Ch). Suchitopéquez: Vicinity of Mazatenango, stream-bank, *Maxon & Hay* 3477 (fl., Ch); near Santo Domingo, south of Mazatenango, stream-bank, *Standley* 88900 (fr., Ch). Escuintla: Concepción, *J. D. Smith* 2095 (fr., GH); Escuintla, *Hayes* s.n. (fl., GH); south of Río Burrión, northeast of Escuintla, road-side, *Standley* 89626 (fr., Ch). Santa Rosa: Río de La Plata, *Heyde & Lux* 4261 (fl., GH, NY); about Guazacapán, in damp forest, *Standley* 78677 (fl., Ch); wet forested quebrada, Río de la Cruz, east of Taxisco, *Standley* 79005 (fl., Ch); road-side, region of Capulín, south of Los Cerritos, on road to El Ahumado, *Standley* 79623 (fl., Ch). HONDURAS: Tegucigalpa: Mont. de la Flor, river-bank in pine-region, *C. & V. W. von Hagen* 1135 (sterile, NY). Yoro: Near Progreso, Farm 42, *Hottle* 85 (fl., Ch), 106 (fl., Ch). BRITISH HONDURAS: Toledo: "Forest Home," Punta Gorda, in open pasture, *Schipp* 1037 (fl., GH, NY); forest, Moho River, *Peck* 553 (fl., GH); Temash River, *Stevenson & Smart* 126, 130 (*Y* 19785) (fl., Ch, Y). EL SALVADOR: Ahuachapán: Vicinity of Ahuachapán, *Standley* 19883, 20280 (fl., GH). Sonsonate: Vicinity of Izalco, *Standley* 22225 (fl., GH, NY). La Libertad: Santa Tecla, *S. Calderón* 1419 (fl., GH, NY). Usulután: Triunfo, *Shannon* 5003 (fl., GH). NICARAGUA: Chinandega: Chinandega, *Baker* 2015 (fl., Ch, GH, NY). COSTA RICA: Guanacaste: Near Nicoya, *Tonduz* 13806 (fl., GH), *Valerio* 495 (fr., Ch). Puntarenas: Santo Domingo, *Tonduz* 7153 (*Herb. Nat. Costa Rica* 10047) (fl., GH); between Puerto Jiménez and Santo Domingo, *Brenes* 12278 (757) (fr., Ch). Alajuela: Cataracts of San Ramón, *Brenes* 13664 (fl., Ch); Alajuela, *J. D. Smith* 6755 (fl., GH); in forest of Pacific tropical zone, Atenas, *A. Smith* 2465 (fl., A). San José: Vicinity of El General, *Skutch* 3836 (fl., A, NY). PANAMA: Without locality, *Hayes* 1021 (fl., NY), *Mell* s.n. (fr., NY). Bocas del Toro: Changuinola Valley, *Dunlap* 215 (fl., Ch), *Cooper & Slater* 86 (*Y* 10267) (fl., Ch). Chiriquí: San Felix, *Pittier* 5145 (fl., Ch). Coclé: Above Penonome, *R. S. Williams* 257 (fl., NY), 319 (fl., fr.; NY), 530 (fl., NY). Canal Zone: Gatun Lake, near laboratory, *Wetmore & Abbe* 17 (A, Ch, GH), 43 (fl., A, Ch, GH), 314 (fl., A, Ch); alluvial bottom near Bohio, *Maxon* 4772 (fl., Ch); vicinity of Miraflores Lake, *G. White* 191 (fl., Ch, GH), *P. White* 276 (fl., Ch, GH); between Miraflores and Corozal, *Pittier* 2495 (fl., NY); near lake, vicinity of Cocoli River, *P. White* 95 (fr., Ch, GH, Mo); Barro Colorado Island, *M. Brown* 40, 68, 72, 188 (fl., Ch), *Shattuck* 314, 458, 807 (fl., Ch), *C. L. Wilson* 2 (fl., Ch); along Río Fató, in forests and thickets, *Pittier* 3873 (fr., NY). Panama: Vicinity of Arraijan, *P. H. Allen* 1622 (fl., Ch, GH, Mo, NY); Chepo, *Kluge* 27 (fl., Ch). Darién: Chepigana, Tucuti, *M. E. & R. A. Terry* 1391 (fl., A, Ch, Mo).

NATIVE NAMES: "Aguacate del monte" (El Salvador); "Aguacatillo" (Mexico, Honduras, British Honduras, Costa Rica); "Canelon" (El Salvador); "Quizarrá," "Quizarrá quina" (Costa Rica); "Sangre blanco" (Honduras); "Sweetwood" (Panama); "Timbersweet," "Wild Pear" (British Honduras).

This species, as it occurs in Mexico and Central America, has branchlets that are closely and minutely subferruginous-pubescent, in the early stages angled and flattened at the nodes, later becoming reddish brown, striate, and glabrous. The leaves are borne on stout petioles up to 1.5 cm. long, minutely pubescent to glabrous and canaliculate. The blades are coriaceous, shining above and dull beneath, with obscure reticulation, early minutely pubescent, becoming glabrescent to glabrous, elliptic to oblong-elliptic, the base rounded or sharply cuneate, the latter appearance due to the lower centimeter of the leaf-base being recurved, the apex long-acuminate. The costa is slightly impressed above and rather conspicuous and elevated beneath. The lateral nerves are inconspicuous above and slightly elevated beneath, numbering 8–12 pairs and diverging at an angle of 30–45°, frequently bearing pubescent glands in their axils. The stout paniculate inflorescence measures up to 20 cm. long, is minutely subferruginous-pubescent to glabrescent, many-flowered, usually widely branching, the peduncle varying from very short to 8 cm. in length. The flowers are very large and conspicuous, up to 12 mm. in diameter, with reflexed lobes that are very fleshy, papillose within and pubescent without, 4–5 mm. long, elliptic or obovate-elliptic, acutish or obtuse at the apex. The two outer series of stamens are ± 1.25 (–1.5) mm. long, with the sessile or subsessile anthers rounded or broadly rounded-ovate, the fleshy papillose connective often one-third the entire length. The stamens of the inner series are ± 1.7 mm. long, the broad anthers narrowing slightly into thick filaments almost one-half their length and bearing at the base two conspicuous spreading sessile glands almost the length of the anthers. The almost triquetrous staminodia are ± 1 mm. long, the thick stipe nearly one-half the entire length. The glabrous gynaecium measures ± 1.7 mm. long, the subglobose ovary two-thirds the entire length. The short style is topped by a triangular discoid or obtuse stigma. The globose apiculate fruit, about 1 cm. in diameter, is subtended by a very shallow cupule up to 2 mm. long, 8 mm. in diameter, and 2 mm. deep, with the margin usually entire and thin. The pedicel is up to 5 mm. in length and expanded to 3 mm. in diameter at the apex.

It is not certain at the present moment that *N. globosa* is the correct binomial for the species involved. Kostermans (Meded. Bot. Mus. Utrecht 25: 19, 54. 1936) believes that Aublet's name *globosa* should replace *N. antillana* of Meissner, the West Indian entity not occurring in Surinam, and that Mez' *N. globosa* should be reduced under *N. Pisi*. Until types are available for study, the species from Mexico and Central America may continue to go under the name of *N. globosa*.

There can be no doubt that *Sassafridium macrophyllum* Rose belongs with this species. The earlier described *Sassafridium veraguense* is an *Ocotea*.

10. *Nectandra ramonensis* Standley in Field Mus. Publ. Bot. 18: 453. 1937.

DISTRIBUTION: Costa Rica and adjacent Panama.

COSTA RICA: Alajuela: Near San Ramón, *Brenes* 353 (478) (fl., Ch); San Pedro de San Ramón, on the side toward San Francisco, *Brenes* 6612 (478) (fl., Ch); on the trail to San Francisco, *Brenes* 6660 (fl., Ch); San Francisco and San Pedro de San Ramón, Feb. 7, 1933, *Brenes* 17018 (fl., TYPE, Ch); Río Jesús de San Ramón, *Brenes* 14988 (fl., Ch); La Calera de San Ramón, on the trail to La Calera, *Brenes*

21990 (fl., Ch); between Santiago and San José de San Ramón, *Brenes 6834* (fr., Ch); La Palma de San Ramón, *Brenes 6819* (fl., Ch). PANAMA: Prov. unknown, Sabana de la Tortuga, *Pittier 3307* (fr., Ch). Chiriquí: Boquete, *Davidson 566* (fl., Ch, Mo). Coclé: Vicinity of El Valle, *P. H. Allen 1635* (fl., Ch, GH, Mo, NY); north rim of El Valle, *Alston (Allen?) 1858* (fr., Ch, GH, Mo, NY).

This species is very close to *N. globosa*, occurring insofar as is known at present in Costa Rica and Panama. A similar pubescence clothes the young branchlets and leaves. The branchlets however at maturity are usually grayish, the outer cortex sometimes flaking off to reveal a dark reddish brown color. The leaves are subtended by short slender pubescent petioles less than 1 cm. long. The blades are sericeous beneath in the early stages, later becoming minutely pubescent. The adult leaf-blades are shining above, dull beneath, elliptic, occasionally oblong-elliptic, the base obtuse and/or the lowermost portion attenuately cuneate, frequently almost decurrent and recurved. The apex is obtuse to acutish or acuminate, the costa and lateral nerves slightly impressed above and somewhat obscure, slightly elevated beneath. The lateral nerves number not more than 4 or 5 pairs, diverging from the costa at an angle of 35–45° and bearing pubescent glands in their axils. The inflorescence consists of fewer-flowered axillary or subterminal panicles minutely subferruginous-sericeous-tomentellous and up to 8 cm. long at most, with long stout peduncles frequently up to 6 cm. long. The flowers are similar to those of *N. globosa* in structure. The fruits are ellipsoid rather than globose, 1.5 cm. long and 9 mm. in diameter, subtended by deeper cupules 4–5 mm. long, 8–10 mm. in diameter, and 2–3 mm. deep. The pedicel is about 5 mm. long and 3–4 mm. in diameter at the apex.

11. *Nectandra Heydeana* Mez & J. D. Smith in Bot. Gaz. 19: 262, t. 25. 1894; Standley & Calderón, Lista Prelim. Pl. Salvador 84. 1925.

DISTRIBUTION: Guatemala and Honduras, at 900–1360 m. altitude.

GUATEMALA: Alta Verapaz: Along Río Carchá, near San Pedro Carchá, *Standley 92158* (fl., Ch). Santa Rosa: Santa Rosa, alt. 900 m., Nov. 1892, *Heyde & Lux 4260* (fl., ISOSYNTYPE, GH, NY), Jan. 1893, *Heyde & Lux 4578* (fl., ISOSYNTYPE, GH, NY). HONDURAS: Tegucigalpa: Along river, Mont. de la Flor, Guarabuqui, *C. & V. W. von Hagen 1275* (fr., Ch, NY).

NATIVE NAME: "Aguacatilla" (Honduras).

The present species, so little collected to date, has branchlets which are early close fulvous-pubescent, later glabrescent, angled, becoming striate. The leaves are borne on slender petioles up to 2 cm. in length which are subcanaliculate and fulvous- or grayish-pubescent. The blades are glabrous except for the pubescent axillary glands beneath, elliptic, sometimes oblong-elliptic, the base cuneate or obtuse or even almost rounded, the apex abruptly acuminate or obtuse, up to 19 cm. long and to 8 cm. broad. The costa is impressed and conspicuous above and the lateral nerves, of which there are usually 7 or 8 pairs, are very slightly elevated and conspicuous above, whereas both are conspicuously elevated beneath. The lateral nerves diverge from the costa at an angle of 35–45°, and the reticulation is prominent throughout. The axillary inflorescence is few-flowered, glabrous, paniculate, up to 7 cm. long, and is borne on a slender peduncle up to 5 cm. long. The flowers are large, almost 4 mm. long and up to 7 mm. in diameter, the slender filamentous pedicels glabrous and up to 5 mm. long. The broadly elliptic lobes are rather fleshy, ± 3.8 mm. long, and papillose

on the inner surface. The stamens of the two outer series are ± 1.25 mm. long, with anthers that are almost square or broadly ovate, truncate, nearly sessile, sometimes mucronate. Those of the inner series are ± 1.7 mm. long, the squarish anthers somewhat emarginate, the two upper cells definitely lateral. The filaments are one-half as long as the anthers and bear laterally at the base two broad spreading glands about half their length and twice as broad as long. The staminodia are ovate, ± 0.6 mm. long and densely shaggy-pubescent. The glabrous gynaecium is ± 2.5 mm. long; the subglobose or broadly ovoid ovary is not quite twice the length of the style with its almost peltate conspicuous stigma.

The fruit of the Honduran specimen is ellipsoid, greenish black in the dried state, up to 2.5 cm. long and 1.8 cm. broad, subtended by a shallow woody flaring cupule not more than 6 mm. long, 1 cm. in diameter, and less than 3 mm. deep. The expanded pedicel, also woody, reaches a length of 9 mm. and a breadth of 5 mm. at its apex.

The species may be said to show a slight relationship to *N. Woodsoniana*, but the grayish pubescence of the many-flowered inflorescence of the latter separates it immediately. The fruits of the two species are entirely different, that of *N. Woodsoniana* being much smaller and with a more shallow cupule.

12. *Nectandra Gentlei* Lundell in Contr. Univ. Mich. Herb. 6: 13. 1941.

DISTRIBUTION: Southern Mexico, Guatemala, Honduras, British Honduras, and Panama.

MEXICO: Oaxaca: Ubero, *L. Williams* 9377 (fr., A, Ch, NY). GUATEMALA: Petén: La Libertad, *Lundell* 2578 (fr., Ch, NY). Huehuetenango: Wooded slopes bordering Río Lacandon, between Ixcán and Río Ixcán, Sierra de los Cuchumatanes, *Steyermark* 49354 (fl., Ch). Alta Verapaz: Cubilgüitz, *von Tuerckheim* 8578, 8579 (fl., GH, NY); woods between Finca Cubilgüitz and Hacienda Yaxcabanal, *Steyermark* 44827 (fr., Ch); wet forest, above Tamahú, *Standley* 70932 (sterile, A). BRITISH HONDURAS: Belize: Forest near Manatee Lagoon, *Peck* 196 (fl., GH). Stann Creek: Mullins River, in high ridge on river-bank, *Gentle* 3456 (fl., ISOTYPE, A, NY); Middlesex, *Schipp* 337 (fl., Ch, GH, NY); Stann Creek Railway, 10 mile, *Schipp* 164 (fr., GH, NY). Toledo: In forest, *Peck* 574 (fl., GH). HONDURAS: Near Puerto Sierra, *P. Wilson* 558 (fr., Ch, GH, NY). PANAMA: Province unknown, Cana and vicinity, *R. S. Williams* 797 (fr., NY). Chiriquí: El Pedregal de David, *Pittier* 5117 (fl., Ch). Coclé: Above Penonome, *R. S. Williams* 617 (fr., NY). Canal Zone: Vicinity of Miraflores Lake, *P. White* 243 (fl., Ch, GH, Mo); Ancon Hill, *Killip* 3032 (fl., Ch), *Standley* 26376 (fr., GH); near Quarantine Station, *Pittier* 2076 (fr., Ch); Hospital Grounds, *Pittier* 2733 (fr., GH); between Corozal and Ancon, *Pittier* 2639 (fr., NY); Balboa, hillside, west side of Canal, *Rowlee & Stork* 987 (fl., NY). San José Island: Perlas archipelago, Gulf of Panama (about 55 miles SSE of Balboa), *Johnston* 82 (fl., A), 221 (fl., A), 270 (young fr., A), 521, 699, 716 (fr., A).

This species has angled branchlets that early are covered with a close short subtomentellous pubescence of a pale ferruginous or brownish color, presently becoming fuscous, and eventually the branchlets being glabrescent to glabrous, dark reddish brown, and striate. The leaves are supported by petioles up to 1.5 cm. long, canaliculate, and brown-tomentellous. The chartaceous lanceolate leaf-blades appear cuneate at the base but actually are rounded or even subauriculate, the extreme bases being usually tightly recurved. The apex of the blade is attenuate into a slender acumen which may or may not be caudate. The blades measure up to 20 cm. long and to 4.5 (-5) cm. broad, the broadest part of the blade being at or below the middle. The blades are early sericeous throughout, but soon become gla-

brescent to glabrous above, remaining shortly but persistently pubescent beneath. The costa and lateral nerves alike are slightly impressed and rather inconspicuous above, being prominently elevated beneath. The lateral nerves number 4–6, occasionally 7 or 8, and diverge arcuately from the costa at an angle of about 45° . At a distance of 1–1.5 cm. from their origin they ascend abruptly and follow the outline of the leaf almost parallel with the midrib. The inflorescence is axillary, paniculate, subferruginous- or brown-tomentellous, becoming glabrescent, measuring up to 8 (–12) cm. in length, the peduncle reaching a length of 4 (–6) cm. The flowers are yellow or white, sometimes fragrant, up to 3 mm. long and 5.5 mm. in diameter, the perianth-tube being well defined, constricted at the apex, and about 1 mm. long. The lobes are usually elliptic, ± 1.7 (–2.15) mm. long, rather thick and papillose at the tip. The stamens of the two outer series are ± 0.6 –.8 mm. long, the anthers subreniform-globose, almost sessile. Those of the inner series are ± 0.8 (–1) mm. long, with almost square anthers slightly emarginate, with large conspicuous and contiguous glands borne at the base of the short filaments. The slender, stipitate, often pubescent staminodia are variable, lanceolate, oblanceolate, or even ovate. The glabrous gynaecium is ± 1.7 mm. or less long, the style slightly longer than the ovoid ovary, and topped by a conspicuous triangular slightly decurrent stigma. The fruit is subglobose, about 8 mm. in diameter, glabrous and black at maturity. It is subtended by a thin shallow cupule not more than 3 mm. long, 6 mm. in diameter, and usually less than 2 mm. deep, glabrous and with an entire margin. The pedicel is less than 5 mm. long and expanded at the apex to about 2 mm. in diameter.

Nectandra Pichurim (H.B.K.) Mez, in which Mez included *N. cuspidata* Nees, was interpreted by him to include specimens collected from Mexico south to Brazil and Venezuela. Kostermans (Meded. Bot. Mus. Utrecht 25: 21. 1936) believes *N. cuspidata* to be distinct from *N. Pichurim* because of the difference in the type of pubescence, the number of primary nerves, the cupule-shape, etc. It is my belief that the Mexican and Central American entity is to be separated from *N. cuspidata* also on floral characters as well as foliage. The apex of *N. cuspidata* is attenuate but always obtuse. Further collections may show an intergradation of all of these characters. *Nectandra membranacea*, from the West Indies, has also been confused with the species under discussion. A glance at the original description of the latter immediately precludes the possibility of their being identical, for Grisebach gives the leaf-blades as ovate-oblong or elliptic with an abruptly acuminate apex. The texture of the leaf and the recurved base recall *N. globosa*, but the small flowers separate it at once from the latter.

13. *Nectandra Woodsoniana*, sp. nov.

Arbor 7–15 m. alta, ramulis breviter adpresse fulvo-tomentellosis, mox glabrescentibus brunnescentibus demum angulatis striatis glabris griseis. Folia alternata, petiolis plus minusve atris ad 1.5 (–2) mm. longis canaliculatis pubescentibus vel glabrescentibus, laminis glabrescentibus vel glabris glandulis axillaribus exceptis, in sicco griseo-viridibus, ellipticis vel oblongo-ellipticis, ad 24 cm. longis et 8 cm. latis, basi cuneatis, apice obtusis acutis vel acuminatis, penninerviis, costa supra conspicua leviter impressa subtus

elevata, nervis lateralibus 7 vel 8 (-10)-paribus supra leviter subtus valde elevatis angulo 45 vel 35° divergentibus, rete venularum supra leviter subtus conspicue elevato. Inflorescentia axillaris vel subterminalis, ad 20 cm. longa, paniculata, dense et adpresse griseo-pubescentis mox glabrescens, multiflora, pedunculo ad 10 cm. longo. Flores ad 3 mm. longi, pedicellis 2-3 mm. longis pubescentibus, perianthio albo, lobis ellipticis vel ovatis vel anguste obovatis, ± 2.5 mm. longis, carnosus, intus papillosus, extus pubescentibus; staminibus ser. I & II $\pm 0.6-0.8$ mm. longis, antheris subreniformibus filamentis robusto duplo longioribus, ser. III $\pm 0.9-1.25$ mm. longis, antheris quadratis filamentis biglandulosis aequalibus, glandulis antheris longitudine aequalibus; staminodiis ± 0.6 mm. longis ovatis obtusis stipite robusto dimidio brevioribus; gynaecio glabro ± 1.7 mm. longo, ovario ovoideo longitudine $\frac{3}{4}$ gynaecii aequante, stylo brevi stigmate discoideo conspicuo. Fructus ad 15 mm. longus et 10 mm. latus, in sicco atropubescentis, ellipsoideus, cupula vadosa discoidea lignosa, glabra vel glabrescente rugosula, ad 2 mm. longa, 5-6 mm. diam., et 1 mm. alta subtentus, pedicello incrassato striato glabrescente ad 2 mm. longo.

DISTRIBUTION: El Salvador, Costa Rica, and Panama, from an altitude of 1800 m. in Costa Rica to 670 m. farther south, and finally in central Panama as low as 20-90 m.

EL SALVADOR: Ayutuxtepeque, *S. Calderón 1117* (fl., GH, NY). COSTA RICA: Province unknown, Las Nubes, *Valerio 1451* (fl., Ch). Guanacaste: Obrededores de Tilarán, *Brenes 15617* (fl., Ch). Alajuela: Hills about San Pedro de San Ramón, *Brenes 5826* (fr., Ch), *16824* (fr., Ch), *19203* (fl., Ch); San Francisco de Guadalupe, *Pittier 11490* (fr., Ch). Limón: Monte Verde, *Stork 1688* (fr., Ch). San José: Río Virilla, *Brenes 14296* (fl., Ch); Escasú, *Valerio 1327* (fl., Ch); vicinity of El General in a bushy clearing, *Skutch 2634* (fl., GH, NY), *4374* (fl., A, NY); Potrero of Don José, Barrantes near S. Isidro del General, alt. 720 m., June 30, 1932, *Stork 3059* (fl., TYPE, Ch). PANAMA: Canal Zone: Mamei Hill, *Pittier 3803* (fl., GH); vicinity of Salamanca Hydrographic Station, Río Pequení, *Woodson, Allen & Seibert 1620* (fl., A, Mo, NY).

NATIVE NAMES: "Tepeaguacate" (El Salvador); "Laurel," "Quisarrá" (Costa Rica).

Nectandra Woodsoniana is striking because of its gray-green foliage and long grayish-pubescent inflorescence. The species is very near *N. martinicensis*, from the West Indies, but the latter has leaves that are 18 × 5.3 cm., the margin of the blades recurved. The filaments are pilose, the anthers depressed-orbicular and slightly papillose, the apex rounded, and there are large staminodia present.

The species is named for Dr. Robert E. Woodson, Jr., whose contributions toward making known the flora of Panama are of the greatest value.

14. *Nectandra Lundellii*, nom. nov.

Persea Gentlei Lundell in Contr. Univ. Mich. Herb. 6: 18. 1941, not *Nectandra Gentlei* Lundell (1941).

Phoebe Gentlei Standley & Steyermark in Field Mus. Publ. Bot. 23: 117. 1944.

DISTRIBUTION: Known only from British Honduras.

BRITISH HONDURAS: Stann Creek: Middlesex, *Hope 3* (Y 4798) (fl., Ch, Y), *Gentle 2896* (fl., fr., A, NY), *2949* (fl., A, NY); in Stann Creek Valley on high ridge, March 30, 1940, *Gentle 3288* (fl., ISOTYPE of *Persea Gentlei*, Ch, NY) (tree 30 cm. in diam.; flowers white, fragrant); Big Eddy Ridge, *Gentle 3308* (fl., A, NY), *3343* (fr., A). Toledo: In open places on river-bank, Río Grande, *Schipp 1164* (fr., Ch, GH, NY).

NATIVE NAMES: "Ca'ca'woung," "Timbersweet," "Wild Pear" (British Honduras).

This tree has young branchlets that are densely tawny-sericeous, becom-

ing more darkly pubescent and finally glabrescent with age. The leaves are borne on stout petioles up to 2 cm. long and up to 4 mm. in width. The blades are coriaceous or subcoriaceous, shining above and glabrous, beneath dull and minutely but definitely pubescent at maturity, elliptic or oblong-elliptic, cuneate at the base or obtusely cuneate, the apex usually abruptly acuminate, up to 32 cm. long and to 14.5 cm. broad. The costa is deeply impressed above and thickly and prominently elevated beneath. The 8–13 pairs of lateral nerves are very lightly elevated above and more so beneath and slightly pubescent, diverging from the costa at an angle of about 45–55°. The reticulation is very prominent above and more delicately so beneath. The inflorescence is axillary or subterminal, paniculate, tawny-sericeous, up to 18 cm. long, the stout glabrescent peduncle up to 8 cm. long. The fragrant white flowers are shortly sericeous-tomentose, becoming glabrescent, up to 4 mm. long. The obovate-orbicular lobes are ± 3.5 mm. in length, reflexed at anthesis, thick and papillose. The stamens of the two outer series are ± 0.8 mm. long, the squarish anthers subtended by very short stout filaments. Those of the third series are 1 mm. long, with anthers almost rectangular, about twice the length of the filaments, which bear sessile conspicuous glands at the base equalling the anthers in size. The staminodia are fairly conspicuous, ± 0.8 mm. in length, the subtriquetrous tips equalling the rather stout stipes. The glabrous gynaecium measures ± 1.25 mm. in length, the globose ovary topped by a nearly sessile rather inconspicuous discoid stigma. The fruit is blackish, ellipsoid, glabrous, up to 2.5 cm. long and 1.3 cm. broad, borne on a flaring irregularly lobed woody glabrous cupule 8–10 mm. long and to 17 mm. in diameter at the apex, and about 5 mm. deep. The supporting pedicel is not more than 5 mm. long and expanded to 4–5 mm. at the apex.

This species is very similar to *N. rubriflora*; for a further discussion of the similarity to that species see the preceding pages. The cupules of the Schipp number are entire and not lobed, and the leaves are less coriaceous, but other than this the specimens match *N. Lundellii*.

15. *Nectandra savannarum* (Standley & Steyermark), comb. nov.

Phoebe savannarum Standley & Steyermark in Field Mus. Publ. Bot. 23: 118. 1944.

DISTRIBUTION: In Guatemala, at an altitude below 400 m. except for the specimens collected in the cloud-forest in Chiquimula, where the altitude is given as 500–1500 m., and mountain-slopes and coastal plains of Honduras and British Honduras.

GUATEMALA: Alta Verapaz: Along stream bordering forest south of savanna between base of Cerro Chinajá at Sachaj and Sacacao, alt. 150–180 m., April 6, 1942, *Steyermark 45712* (fl., TYPE, Ch) (tree 9 m.; leaves firmly membranous, deep green and shining above, dull and paler green beneath; flowers white); near the top of wooded ridge, vicinity of Cubilgüitz, 1½–2 miles south of Cubilgüitz, *Steyermark 44428* (fl., Ch); south of Cubilgüitz, *Steyermark 44499* (fl., Ch). Izabal: Along stream between Milla 49.5 and ridge 6 miles from Izabal, Montana del Mico, *Steyermark 38625* (fl., Ch); wet thicket near Puerto Barrios, *Standley 73043* (sterile, Ch). Chiquimula: Cloud-forest on top, Cerro Tixixí (Tishishí), 3–5 miles north of Jocotán, *Steyermark 31567* (fr., Ch). HONDURAS: Atlántida: On bank of the Danto River, lower slopes of Mt. Cangrejal, back of La Ceiba, *Yuncker, Koepfer & Wagner 8762* (fl., Ch, NY). BRITISH HONDURAS: Belize: Mullins River Road, *Schipp 79* (fl., fr., Ch, GH, NY); Gracie Rock, Sibun River, *Gentle 1572* (fl., NY). Stann Creek: Big Eddy River, in high ridge, *Gentle 3488* (fl., A).

NATIVE NAMES: "Laurel" or "Lavrel" (Guatemala); "White laurel" (British Honduras).

This species, originally described under *Phoebe*, has slender branchlets early covered with a close brownish pubescence that presently disappears, leaving the branchlets dark brown or eventually grayish. The leaves are borne on slender petioles that are pubescent and slightly canaliculate, reaching a length of 6, rarely 8, mm. The blades are glabrous, chartaceous to subcoriaceous, elliptic to oblong-elliptic, occasionally ovate-elliptic, obtusely caudate-acuminate, the acumen as long as 1 cm., the base cuneate or obtusely cuneate or almost rounded, up to 8.5 (–11.5) cm. long and 3.5 (–4.5) cm. broad, the costa impressed but conspicuous above, the 4 or 5 pairs of lateral nerves inconspicuous above, except the basal pair, all elevated beneath. The lower pair or pairs of lateral nerves usually diverge from the costa at an angle of about 35°, whereas the upper less conspicuous pairs diverge at an angle of 45° or more. The appearance simulates a subtriplinerved condition. The reticulation is loose and obscure above but more closely knit and prominent beneath. The glabrescent few-flowered inflorescence consists of an axillary panicle up to 4 cm. long, subtended by a slender glabrescent peduncle up to 2 cm. in length. The white flowers are pubescent and up to 3 mm. long, the diameter 8.5 mm., the filamentous pedicel 2–3 mm. long. The elliptic thick lobes are about 3 mm. long and papillose within. The two outer series of stamens are ± 0.8 mm. long, consisting of subreniform often emarginate anthers borne on thick very short filaments. Those of the third series are ± 1 mm. long, with squarish anthers slightly longer than the filaments, which bear two roundish short-stipitate glands at their bases. The staminodia are usually stipe-like, ± 0.6 mm. long. The glabrous gynaecium measures ± 1 mm. long, the depressed-globose short-stipitate ovary nearly twice the length of the style, which bears at its apex a peltate conspicuous stigma. The immature (?) fruit is subglobose, apiculate, borne in a cyathiform coral-orange, according to the collector, cupule, up to 4 mm. long, to 8 mm. in diameter, and 3–4 mm. deep, undulate or often bearing the persistent remains of the enlarged lobes of the perianth. The pedicel measures up to 8 mm. long and has expanded to 3 mm. in diameter at the apex.

Although the flowers of the type possess staminodia that are conspicuous, a character of the genus *Phoebe*, the shape of the anthers and the gynaecium as a whole place the species under *Nectandra*.

16. *Nectandra longicaudata* (Lundell), comb. nov.

Phoebe longicaudata Lundell in Bull. Torrey Bot. Club 64: 548. 1937.

DISTRIBUTION: British Honduras, Guatemala, and eastern Mexico, usually in advanced forests.

MEXICO: Chiapas: Javalinero, Palenque, *Matuda* 3643 (fl., A, Ch, NY). GUATEMALA: Izabal: Bay of Santo Tomás, between Escobas and Santo Tomás, *Steyermark* 39231 (fr., Ch). BRITISH HONDURAS: El Cayo: On hillside, Vaca, *Gentle* 2474 (fr., A, NY); in advanced forest, on limestone hill, Valentin, *Lundell* 6401 (fr., GH, NY); in riparian and marginal forest near San Augustin, Mountain Pine Ridge, August, 1936, *Lundell* 6757 (fr., SYNTYPE not seen), 6833 (fl., SYNTYPE not seen). Stann Creek: All Pines, in broken forest-clumps, *Schipp* 571 (fr., Ch, GH, NY). Toledo: Near Jenkins Creek in hammock in pine-ridge, north of Monkey River, *Gentle* 4094 (fl., A).

NATIVE NAME: "Aguacatillo" (British Honduras).

I have seen no type-material of this species, but *Lundell* 6401, cited by Lundell, doubtless represents the species described. The branchlets are

early pubescent (rufous-pilose), becoming glabrescent to glabrous with age, and slightly sulcate. The leaf-blades, with flat petioles up to 1 cm. long, are coriaceous, elliptic, up to 14 cm. long and 4.5 (-6.2) cm. broad, with often oblique cuneate bases and acuminate to caudate-acuminate apices. The costa and 4 or 5 pairs of lateral nerves are impressed above and elevated beneath, the lateral nerves bearing pubescent glands in their axils and diverging from the costa at an angle of 35-45°. The blades are everywhere reticulate. The few-flowered inflorescences are not longer than 4.5 cm. and are pubescent, becoming glabrescent. The flowers are about 4 mm. long, borne on slender pubescent pedicels up to 3 mm. The elliptic perianth-lobes are ± 3.5 mm. long and are spreading and often reflexed. The stamens of the two outer series are ± 0.8 mm. long, the anthers subsessile and subreniform. Those of the inner series are rectangular, slightly longer than the filaments, which are sparsely pubescent at the base and bear conspicuous sessile glands the length of the filaments. The staminodia are cordate, up to 0.7 mm. long, the slender pubescent stipes more than half the entire length. The glabrous gynaecium is ± 1.5 mm. long, the subglobose ovary slightly stipitate, with a short style topped by a discoid stigma. The ellipsoid or subglobose apiculate black fruit, $12 \times 9-10$ mm., is seated on a shallow cyathiform cupule not more than 2 mm. long and 6 mm. broad at the apex, and about 1 mm. deep. The subtending pedicel is enlarged to about 7 mm. in length and 2.5 mm. in width at the apex.

The nearest relatives of the species may be found, generally speaking, in the *N. salicifolia* complex. Specifically *N. longicaudata* resembles *N. savannarum*, from the same general area, from which it is readily distinguished by the persistent ferruginous pubescence of the young branchlets and the rather decided tendency toward a subtriplinerviate condition. The leaves of *N. savannarum* are on the whole smaller, not more than 11.5 cm. long at most. *Schipp 571* has leaves that are more heavily coriaceous, varnished-shining above, and more heavily and more conspicuously reticulate. The fruit is oblong-elliptic, consistently 16×8 mm., the infructescence as a whole being more robust than that of the other specimens.

Gentle 1572, cited by Lundell under *Phoebe longicaudata*, seems to belong with *N. savannarum*.

17. *Nectandra nervosa* Mez & Pittier ex Mez in Bull. Herb. Boiss. II. 3: 235. 1903; Standley in Field Mus. Publ. Bot. 18: 453. 1937.

DISTRIBUTION: Costa Rica, known only from the type-locality.

COSTA RICA: Puntarenas: Terraba, at the mouth of the river on the banks, *Tonduz* (Herb. Inst. Costa Rica) 6758 (fr., TYPE not seen).

Slender glabrous branchlets and shortly pilose buds characterize this species, known only from the type. The glabrous leaves are borne on slender canaliculate petioles up to 8 mm. long. The blades are broadly lanceolate or elliptic-lanceolate, acute at the base, very acuminate at the apex, chartaceous, 13 cm. long and 3.5 cm. broad, above in the dried state glaucous, below reddish green, everywhere densely and very prominently reticulate. The inflorescence is unknown, but the infructescence is longer than the leaves (three or more times) and is glabrous, with the fruit-bearing pedicel enlarged up to 10 mm. in length. The ellipsoid fruit is 10 mm. long and 6 mm. in diameter, subtended by a semi-globose acutely simple-margined cupule which in the dried state is verruculose.

The affinity of the species is noted under *N. salicina*.

18. *Nectandra salicina*, sp. nov.

Arbor 5–8 m. alta, ramis dense foliosis, griseis, sulcatis, glabris, ramulis brunneis mox griseis, striatis, angulatis. Folia alternata vel saepe subopposita, petiolis alatis gracilibus glabris canaliculatis, 5–10 mm. longis et 1 mm. latis, laminis utrinque glabris, supra lucidis subtus minus, coriaceis, in sicco viridibus vel interdum brunneis, subtus saepe leviter pallidis, lanceolatis, ad 10 (–11) cm. longis et 2–2.5 (–3.4) cm. latis, basi attenuato-cuneatis, apice acutis vel attenuato-acuminatis saepe attenuato-obtusacuminatis, penninerviis, costa supra obscura subtus conspicue elevata, nervis 6 vel 7-paribus utrinque obscuris angulo 25–35° divergentibus, rete venularum nunc utrinque conspicuo nunc supra inconspicuo. Inflorescentia axillaris, paniculata, 8–9 (–12) cm. longa, glabra, pauciflora, gracilis, longipedunculata, pedunculo 6–8 cm. longo, glabro. Flores ad 3 mm. longi, pedicellis ad 5 mm. longis, tenuibus, perianthio vadoso subcampanulato, cano, lobis oblongis recurvatis crassis intus et apice extus dense papilloso-tomentosis, ad 3 mm. longis; staminibus ser. I & II ± 0.9 mm. longis et latis, antheris reniformibus plerumque filamentis duplo longioribus, ser. III ± 1.25 mm. longis, conspicue biglandulosis, glandulis et filamentis antheris subaequalibus; staminodiis conspicuis triangularibus stipitatis ± 0.6 mm. longis; gynaecio glabro ± 1.5 mm. longo, ovario subgloboso stylo duplo longiore, stigmatibus plerumque triangularibus conspicuis. Fructus viridis, fide coll., subglobosus, apiculatus, 20 \times 18 mm., cupula rubra minute verruculosa, fide coll., glabra, ad 6 mm. longa, 10–12 mm. lata, et 2–3 mm. alta, margine undulata, subtentus, pedicello incrassato glabro, in sicco aciculato, ad 1 cm. longo.

DISTRIBUTION: In Alajuela Province of Costa Rica at 850–1000 m. altitude, in Guanacaste Province at an altitude of 500–600 m., and in the cloud-forest of Cerro Horqueta, Boquete District, Chiriquí, Panama, at 1980 m. altitude.

COSTA RICA: Guanacaste: Vicinity of Tilarán in moist forest, *Standley & Valerio 44506* (fl., Ch). Alajuela: Near San Ramón, *Brenes 371 (515)* (fl., Ch); hedges, along road between San Miguel and La Palma de San Ramón, alt. 900–950 m., Feb. 7, 1925, *Brenes 4206 (218)* (fl., TYPE, Ch) (tree 5–7 m. with conical-globose crown; flowers small, white, in terminal clusters of 2 to 3-flowered cymes); woods, Piedades of San Ramón, alt. 1000 m., June 21, 1925, *Brenes 4272(57)* (fr., Ch) (small tree 5–6 m., fruits green, pendent; cupule vivid red, same length as the peduncle, round or nearly so, small); hedges, woods, San Miguel de San Ramón, *Brenes 5393 (537)* (fl., Ch); Piedades Sur (Quebrada Honda), about La Palma de San Ramón, *Brenes 5846* (fr., Ch); between “Pata de Gallo” and Santiago de San Ramón, *Brenes 6650* (fl., Ch); Camino at Calera and Calera de San Ramón, *Brenes 18942* (fl., Ch); [hills of San Pedro de San Ramón, *Brenes 20332* (fl., Ch)]; Barranca of San Ramón, *A. Smith P.2351* (fl., A). PANAMA: Chiriquí: Cerro Horqueta, Boquete, *C. & V. W. von Hagen 2118* (fr., fragm., A, Mo).

NATIVE NAMES: “Aguacatillo” (Costa Rica); “Sigua blanca” (Panama).

This species seems to be near *N. nervosa* Mez & Pittier. The latter, however, has broadly lanceolate or elliptic-lanceolate leaves up to 13 cm. long, glaucous above and reddish green beneath. The inflorescence is squarrosely tripinnately paniculate. The fruit is ellipsoid, 10 \times 6 mm., with a semi-globose acutely simple-margined cupule, verruculose in the dried state. These characters separate the two entities at once.

19. *Nectandra coriacea* (Swartz) Grisebach, Fl. Brit. W. Ind. 281. 1860; Mez in Jahrb. Bot. Gart. Berlin 5: 459. 1889; Allen in Addisonia 22: 9, pl. 709. 1943.
Laurus coriacea Swartz, Prodr. 65. 1788; Fl. Ind. Occ. 710. 1800.
Nectandra Willdenoviana Nees, Syst. 321. 1836; Meissner in DC. Prodr. 15¹: 165. 1864.
Ocotea Lundellii Standley in Carnegie Inst. Washington Publ. 461: 56. 1935; Standley & Record in Field Mus. Publ. Bot. 12: 143. 1936.

DISTRIBUTION: Florida, West Indies, Yucatan peninsula, British Honduras, and Guatemala.

[JAMAICA: Without locality or collector, (TYPE of *Laurus coriacea* not seen).]
 MEXICO: Yucatán: without locality, *Gaumer* 23980 (fl., Ch, GH, NY), 24248 (fl., Ch, GH), 24274 (fl., GH, NY), 24290 (fl., Ch), 24337 (fl., Ch); Cozumel, *Gaumer* 85 (fl., Ch); Chichen Itza, off Kaua road in advanced deciduous forest, *C. L. & A. A. Lundell* 7435 (fl., A); Lake Chichankanab, *Gaumer & Sons* 23655 (fl., Ch), 23668 (fl., Ch, GH). Campeche: Hacienda San Pablo, near Champoton, Morelos, *Collins* 47a (fl., NY); Tuxpeña, *Lundell s.n.* (fl., Ch), 1071 (fr., Ch), 1367 (fl., NY). GUATEMALA: Petén: Lake Petén, *Lundell* 3195 (fl., Ch), Ixlu ruins, Lake Petén, June 15, 1933, *Lundell* 4359 (fl. type of *Ocotea Lundellii*, Ch); Uaxactún, *Bartlett* 12335 (fl., A, Ch, NY), 12547 (fl., A, Ch, NY). Alta Verapaz: Woods southeast of Finca Yalpemech, near Alta Verapaz-Petén boundary line, *Steyermark* 45216 (sterile, Ch). Izabal: Río Dulce, between Livingston and 6 miles up river on north side (right hand side going up river), *Steyermark* 39402 (fl., Ch). BRITISH HONDURAS: Orange Walk: Coastal region at Honey Camp, *Lundell* 423 (fr., Ch, NY); Belize: Maskall, *Gentle* 1206 (fl., A, Ch, GH, NY), 1216 (fl., A, Ch, GH, NY). Toledo: Jacinto Hills, in shaded valley, *Schipp* 1206 (fl., Ch, GH, NY).

NATIVE NAMES: "Laurel" (Campeche); "Sweetwood" (Jamaica, British Honduras).

This species, as it occurs in our area, has branchlets that vary from brownish and striate to a striking silver-gray. The alternate leaves are borne on petioles that are usually 1 cm. or less in length (7–14 mm.), canaliculate, and glabrous. The blades are coriaceous, glabrous, lanceolate-elliptic or lanceolate-oblong, the base cuneate, the apex obtusely acute or obtusely acuminate, the acumen varying in length from very short and abrupt to nearly 1 cm. The blades measure up to 12 cm. long and 6 cm. broad (usually 7–9 × 3.5–4 cm.). The venation of this species is the most outstanding feature. The costa is prominent, though slightly submersed above, and very prominently elevated beneath. The 6–8 pairs of lateral nerves diverge from the costa at an angle of 45° and are slightly arcuate. The lateral nerves, however, are usually obscured by the very conspicuous over-all rather loose elevated reticulation of the blades. This reticulation usually draws the attention before the lateral nerves are noted. The inflorescence varies from few to many axillary or subterminal panicles not more than 6 (–8) cm. long, either sparsely or densely flowered. The white flowers are 5–8 mm. in diameter, the elliptic lobes heavily papillose, ±3.6 mm. in length. The two outer series of stamens consist of nearly sessile anthers which are reniform and slightly emarginate, measuring ±0.6 mm. in length. The stamens of the inner series are longer, ±0.8–1 mm. long, the squarish anthers borne on filaments almost their equal in length, which bear two large subreniform sessile glands nearly the width of the anthers. The staminodia are triquetrous, ±0.8 mm. long, borne on slender pubescent filaments that are nearly two-thirds the length of the entire structure. The gynaecium is glabrous, ±1.7 mm. long. The subglobose or subovoid ovary is about twice the length of the stout style, which is topped by a conspicuous capitate stigma. The fruit is black, ovoid or subglobose, apiculate,

1 (-1.5) cm. long and 6 mm. wide, at maturity supposedly nearly the same width. The fruit is subtended by a shallow cyathiform cupule 3-4 mm. long and 6-7 mm. in diameter at the undulating apex, and 2.5 mm. deep. The supporting pedicel is up to 8 mm. long, expanding to 2 mm. in diameter at the apex.

The nearest affinity of the species is the entity which heretofore has passed as *Nectandra sanguinea* Rottb. The difference in the fruiting cupule, the venation, and coriaceous texture of the leaves set the species apart. Standley notes that *Ocotea Lundellii* is most nearly related to *Ocotea Catesbyana* Sargent from southern Florida. The latter was based on *Laurus Catesbyana* Michaux, which was once included erroneously under *N. coriacea*. Although the superficial resemblance is striking, the structure of the flowers, particularly the reniform anthers, immediately places the species in *Nectandra*.

20. *Nectandra salicifolia* (H.B.K.) Nees, Syst. Laurin. 302. 1836, in *Linnaea* 21: 506. 1848.

Ocotea salicifolia H.B.K., Nov. Gen & Sp. 2: 132 [166]. 1817; Hooker & Arnott, Bot. Voy. Beechey 309. 1841.

Ocotea globosa sensu Schlechtendal & Chamisso in *Linnaea* 6: 366. 1831.

Nectandra sanguinea sensu Nees, Syst. Laurin. 318. 1836, quoad spec. Mex., non Rolander ex Rottboell; Meissner in DC. Prodr. 15¹: 164. 1864, quoad spec. Mex.; Hemsley, Biol. Centr. Am. Bot. 3: 75. 1882; Mez in Jahrb. Bot. Gart. Berlin 5: 457. 1889, quoad spec. Mex. & C. Am.

Nectandra glabrescens Benthams, Bot. Voy. Sulphur 161. 1846; Walpers, Ann. 1: 575. 1849; Meissner in DC. Prodr. 15¹: 165. 1864; Hemsley, Biol. Centr. Am. Bot. 3: 74. 1882; Mez in Jahrb. Bot. Gart. Berlin 5: 425. 1889, excl. spec. S. Am. & W. Ind.; Standley in Contr. U. S. Nat. Herb. 23: 297. 1922; Standley & Calderón, Lista Prelim. Pl. Salvador 84. 1925; Record in Trop. Woods 10: 21. 1927; Standley in Field Mus. Publ. Bot. 10: 200. 1931; Standley & Record in Field Mus. Publ. Bot. 12: 142. 1936; Yuncker & Record in Field Mus. Publ. Bot. 17: 363. 1938.

Nectandra sanguinea var. *angustifolia* Schlechtendal in *Linnaea* 19: 257. 1847.

Nectandra sanguinea var. β *lanceolata* Meissner in DC. Prodr. 15¹: 164. 1864; Hemsley, Biol. Centr. Am. Bot. 3: 75. 1882.

DISTRIBUTION: Mexico and Central America, at varying altitudes and in diverse habitats.

MEXICO: Without locality, *Galeotti* B.8 (fl., Ch), [718] (fl., Ch); *Haenke* [1540] (fr., NY); *Leibold* 108 (fl. type of *N. sanguinea* var. *angustifolia* not seen). San Luis Potosí: El Banito, 7 mi. south of Valles, *Leavenworth* 189 (fl., Ch, GH); semi-desert road-side south of Valles, *Leavenworth* 223 (fl., Ch, GH, NY); Tamasopo Cañon, *Pringle* 3541, 3725 (fl., GH, NY); Tamazunchale, *Edwards* 602 (young fr., Ch). Vera Cruz: Hacienda de la Laguna, *Schiede* 57 (fr., Mo); Papantla, *Schiede & Deppe* 1144 (fl., cited by Schlechtendal and Chamisso as *O. globosa*, Mo); road from Papantla to Zamora, *Goldman* 88 (fl., GH); Colipa, *Liebmann* s.n. (fl., GH, NY); Jalapa, [*Schiede?*] (fr., GH); Mirador, *Liebmann* s.n. (fr., GH); Zacuapán, *Purpus* 2023 (fr., Ch, GH), 14151, 14327 (fl., Ch); Barranca de Panoya, *Purpus* 8425, 8503 (fl., GH); Remulatero, *Purpus* 8741 (fl., GH, NY); Remudadero, *Purpus* 8955 (fl., GH, NY), 10965 (fl., Ch); banks of Río de los Pescados, near Puente Nacional, *Purpus* 11166 (fl., Ch); Orizaba, *Botteri* 34, 302 (fl., GH), 986 (fl., NY), 1081, 1193 (fl., GH), *Millsbaugh* Herb. s.n. (fl., Ch), *Purpus* 1324 (fl., GH, NY); Cordoba, *Bourgeau* 1961 (fl., Ch, GH, NY), *Orcutt* 3344 (fl., Ch); Cuitláhuac, *Matuda* 1417 (fl., A). Mexico: Temascaltepec, Salitre-Canitas, wet barranca, *Hinton* 3816 (fl., A, NY). Guerrero: La Aguila, *Langlassé* 250 (fl., GH); Acapulco, *Humboldt & Bonpland* s.n. (fr. ?, TYPE OF *Ocotea salicifolia* not seen), *E. Palmer* 164 (fr., GH), 582 (fl., GH, NY). Oaxaca:

Tuxtepec, Chiltepec and vicinity, in llanos, *Martínez-Calderón* 376 (fl., A); Piedras Negras, Pochutla, *Conzatti, Reko & Makrinius* 3203 (fl., GH); Yaveo, trail west to Río Yaveo; Choapam, understory in open forest, *Mexia* 9175 (fl., Ch, GH, NY); Tepenixtlahuaca á Río Verde, *Conzatti* 4385 (fr., NY). Tabasco: Mercedes, Balancan, *Matuda* 3027 (fl., A, Ch); Tenosique, *Matuda* 3402 (fl., A, Ch, NY). Chiapas: Santa Rosa, near Escuintla, in advanced forest, *Matuda* 4264 (fl., A, NY); Malpaso, near Siltepec, in advanced forest, *Matuda* 4522 (fl., A). GUATEMALA: Petén: El Paso, *Lundell* 1528 (fl., NY); Uaxactún, near aguada, *Bartlett* 12355 (fl., Ch); Santa Cruz, 12371 (fl., Ch), 12724 (fl., Ch); La Libertad and vicinity, *Aguilar* 91 (fl., A), 280, 387 (fl., NY), *Lundell* 2113, 2176 (fl., Ch); along Río Santa Izabal, between mouth of Río Sebol and El Porvenir, *Steyermark* 45847 (fl., Ch); along Río Cancuen, between El Cambio and mouth of Río Machaquila, *Steyermark* 45921 (fl., Ch). Alta Verapaz: Between Sachaj and Sacacac, *Steyermark* 45130 (fl., Ch); along Río Semococh, between Semococh and Chajamayic, *Steyermark* 45731 (fl., Ch); along Río Sebol, between Sebol and Carrizal, north of Sebol, *Steyermark* 45757 (fl., Ch); Cubilgüitz, *von Tuerckheim* 8577 (fl., GH, NY). Baja Verapaz: Sierra de las Minas, San Augustine, *Kellerman* 7628 (fr., Ch). Izabal: Río Dulce, between Livingston and 6 miles up river, on north side (right hand side going up river), *Steyermark* 39397 (fl., Ch); bank of Río Dulce, *C. L. Wilson* 406 (fl., Ch). Quezaltenango: Colomba, *Skutch s.n.* (fl., Ch), 1286 (fl., A, NY), 1363 (fl., A, Ch). HONDURAS: Without locality, forest along Highland Creek, Puerto Sierra, *P. Wilson* 145 (fl., NY). Comayagua: Thicket above the plains of Siguatepeque, *Yuncker, Dawson & Youse* 6144 (fl., Ch, GH, NY). Yoro: In open forest on margin of small stream on mountain-slopes near the village of Los Flores, in the Aguan River valley, near Coyoles, *Yuncker, Koepfer & Wagner* 8161 (fl., Ch, GH, NY), 8162 (fl., Ch). Atlántida: On the mountain-slopes and coastal plains, in forest, foothills near the Cangrejal River, in the vicinity of La Ceiba, *Yuncker, Koepfer & Wagner* 8680 (fr., Ch, GH, NY). BRITISH HONDURAS: Without locality, *Castillo* 16 (fl., Ch, Y), *Gentle* 174 (fl., Ch), Northern River, *Gentle* 1035 (fl., NY). Corozal: High ridge, San Joaquín, *Gentle* 8 (fr., Ch), 4748 (fr., Ch, GH, NY). Orange Walk: Roaring Creek, *Lundell* 448 (fl., Ch); Honey Camp, *Meyer* 54 (fr., Ch). El Cayo: Bank of Belize River, *Gentle* 2232 (fl., A, NY). Belize: Little Cocquericot, Belize River, *Lundell* 4361 (fr., Ch), 4362 (fl., Ch, NY), 4363 (fr., Ch); Maskall Pine Ridge, *Gentle* 1055 (fl., GH, NY), 1275 (fr., Ch, NY); Sibun River, *Gentle* 1410 (fr., Ch, NY), 1511 (fl., NY), Gracie Rock, 1524 (fl., NY). Stann Creek: Forest Guard, Freshwater Creek, *Kelly* 2 (fl., Ch, GH, NY); Moho River, in wet forest, *Peck* 737 (fl., GH). COSTA RICA: San José: Vicinity of El General, *Skutch* 4172 (fl., A, NY), 4328 (fl., A, Ch, NY), 4905 (fl., A, Ch, NY).

NATIVE NAMES: "Aguacate" (Vera Cruz); "Aguacatillo" (Michoacán); "Laurel" (Vera Cruz, Yucatán, British Honduras); "Piesito de Paloma" (Mexico); "Timbersweet" (British Honduras).

This is one of the most variable of the *Nectandrae*, which has been known heretofore as *N. sanguinea* Rottb., and is of all species in our area the most widely collected. Originally the species *Nectandra sanguinea* was described from Surinam. Nees extended the range to Martinique, other islands of the West Indies, and Mexico, describing a variety from St. Vincent. He included *Laurus globosa* Aublet from Guiana in the synonymy. Meissner followed Nees, adding another variety from Mexico which included in part *Schiede* 57 and in toto *Ocotea salicifolia* H.B.K. Mez segregated *Laurus globosa* Aublet, under the binomial *Nectandra globosa*. According to Kostermans (Meded. Bot. Mus. Utrecht 25: 20. 1936), Mez did not see the type of *N. sanguinea*, based on Rolander's specimen. Kostermans intimates that the latter name belongs to *N. Pisi* from Surinam, and that *N. sanguinea*

as interpreted by Mez (presumably the Mexican, Central American, and West Indian material) does not occur in Surinam. A complete understanding of the synonymy involved must perforce await examination of the types of the species in question, when they are once more available for study. Insofar as may be ascertained from the specimens at hand, the correct epithet for the Mexican and Central American material appears to be *N. salicifolia* (H.B.K.) Nees. There can be no question of Mez' segregation of *Laurus globosa* Aublet as *Nectandra globosa*, for the shape of the anthers of the latter places it in a different category entirely from *N. salicifolia*.

Nectandra salicifolia, then, may be described as a tree or shrub with branchlets that are angled, becoming terete, striate, brownish and becoming grayish, or sometimes reddish and becoming brown. They are early whitish-pubescent, later becoming glabrous and often shining. The leaves vary considerably, with the petioles up to 1 cm. long, canaliculate, glabrous or glabrescent. The blades are chartaceous to coriaceous, lanceolate, lanceolate-elliptic, or elliptic, cuneate at the base and either acute or obtusely acute or obtusely acuminate at the apex. They measure (4-) 5.5-16 (-20) cm. long and (2-) 3-5 (-9) cm. broad and are glabrous except for pubescent glands in the axils of the lateral nerves on the lower leaf-surface, which are sometimes very conspicuous or often entirely lacking. The costa is impressed above, very prominent beneath; the 5-9 pairs of lateral nerves are slightly elevated beneath and diverge at an angle of 35-45° from the costa. The reticulation of the blade is usually very conspicuous throughout. The subterminal or axillary inflorescences are shorter or occasionally longer than the leaves and are up to 10 cm. long. They may be comparatively few-flowered single panicles or, as is usually the case, many-flowered broad and branching subcorymbose panicles. In the early stages they are whitish-pubescent but shortly become glabrescent or glabrous. The flower is usually between 3 and 4 mm. long (occasionally 5 mm.), with scarcely any noticeable tube, and is supported by a slender pubescent pedicel 3-4 mm. long. At anthesis the perianth-lobes are spreading (the flower being sometimes to 1 cm. in diameter) and reflexed. The lobes are lanceolate-elliptic, occasionally elliptic, usually obtuse, up to 3 (sometimes 5) mm. long, fleshy, pubescent on the outer surface and papillose within. The stamens of the two outer series are ± 0.6 (rarely ± 0.8) mm. long and nearly half again as broad. The anthers are reniform, frequently emarginate, sessile or with very short filaments. The stamens of the third series are longer, with the anthers almost square and emarginate at the tip. The two upper cells are lateral, whereas the two lower are extrorse. The filaments bear at their base two large conspicuous glands almost as long as the anthers. The slender small triangular or triquetrous staminodia are usually ± 0.6 mm. long, borne on stipes nearly $\frac{2}{3}$ their entire length and almost the same width as the staminodia. The glabrous gynaecium is ± 1.25 (sometimes ± 1.9) mm. long. The subglobose ovary is usually three times the length of the short style, which is topped by a flat inconspicuous stigma. The fruit is subglobose to (immature?) ellipsoid, minutely apiculate, to 11 mm. long and 8 mm. in diameter, glabrous, black, subtended by an almost disk-like shallow woody cupule about 1 mm. long and 5 mm. in diameter, glabrous and only slightly undulate. The cupule is supported by the enlarged

pedicel about 5 mm. long, expanded to 3 mm. in breadth at the apex.

Most specimens collected are in the flowering stage and show variations which are definitely within the limits of the species. Occasionally specimens are found in which no staminodia are seen, but this is not usual. The length of the short filament supporting the anther varies considerably. The greatest amount of variation occurs in the specimens from Acapulco, which have larger flowers than the other Mexican specimens.

21. *Nectandra fuscobarbata* (Mez), comb. nov.

Nectandra glabrescens var. *fuscobarbata* Mez in Jahrb. Bot. Gart. Berlin 5: 425. 1889.

Arbor 6–12 m. alta, ramulis brunneis minute sparse pubescentibus mox griseis glabris striatis. Folia alternata, juventute sparse pubescentia mox glabrescentia deinde glabra, petiolis tenuibus, canaliculatis, supra sparse pubescentibus, ad 1 cm. longis et 1 mm. latis, laminis utrinque glabris basi costae subtus excepta, membranaceis, in sicco brunneis vel viridescenti-brunneis, lanceolato-ellipticis, ad 15 cm. longis et ad 5 cm. latis, basi perattenuato-cuneatis, apice longe caudato-acuminatis, penninerviis, costa supra leviter subtus conspicue elevata, nervis 4–6 (–8)-paribus utrinque plus minusve obscuris angulo 55° divergentibus, glandulis inconspicuis in nervorum lateralium axillis, rete venularum utrinque leviter prominulo. Inflorescentia axillaris laxa paniculata, ad 15 cm. longa, sparse pubescens, pedunculo brunneo sparse pubescente, ad 5 cm. longo. Flores ad 3 mm. longi, pedicellis pergracilibus pubescentibus, ad 3 mm. longis, perianthio campanulato albo vel pallide viridescente, lobis oblongis reflexis papilloso-pubescentibus, ± 2.5 mm. longis; staminibus ser. I & II ± 0.6 mm. longis, antheris subreniformibus longitudine $\frac{2}{3}$ filamentis gracilibus basi pubescentibus aequalibus, ser. III ± 1 mm. longis conspicue biglandulosis, glandulis stipitatis antheris oblongis et filamentis aequalibus; staminodiis ovatis stipitatis, basi pubescentibus, ± 0.6 mm. longis; gynaecio glabro, ± 1.25 mm. longo, ovario ovoideo-globo longitudine plusquam stylo minusquam gynaecii aequante, stigmatate capitato conspicuo. Fructus abnormalis(?) subglobosus, apiculatus, conspicue griseo-sericeus, minute papillosus, ± 7 mm. diam., cupula vadosa glabra minute verruculosa subcampanulata 3 mm. longa et 5 mm. diam. subtentus, pedicello ad 5 mm. longo apice ad 3 mm. diam. expanso.

DISTRIBUTION: Known only from Panama.

PANAMA: Without locality, *Hayes 487* (TYPE of *N. glabrescens* var. *fuscobarbata* not seen). Bocas del Toro: Fish Creek Hills, vicinity of Chiriquí Lagoon, *von Wedel 2431* (fl., A); Isla Colon, *von Wedel 2866* (fl., A), *2969* (fl., A); Flat Rock, region of Almirante, *G. P. Cooper 551* (fr., Ch, GH, NY).

NATIVE NAME: "Rock Sweetwood" (Panama).

This entity, seemingly a segregate of *N. salicifolia*, because of the single character of fuscous barbate hairs in the axils of the leaves, has flower-structure similar to that of the latter species. Examination of a large amount of material from Mexico and Central America of the species proper shows many numbers with pubescent glands in the axils of their lower leaf-surfaces. The bases of the filaments as well as the stipes of the staminodia are pubescent. The ovary is glabrous, but the fruit is pubescent. I am inclined from the general aspect of the fruiting material from Bocas del Toro to believe that these are not normal fruits.

22. *Nectandra nitida* Mez in Jahrb. Bot. Gart. Berlin 5: 461. 1889; Standley in U. S. Nat. Herb. 23: 297. 1922.

DISTRIBUTION: Mexico and Panama.

MEXICO: Without locality, western part, *Haenke s.n.* (SYNTYPE not seen).

PANAMA: Canal Zone: Near Barbacans station, *Hayes 133* (SYNTYPE not seen).

This species seems to stand out for its golden-"glittering"-tomentose young branchlets, eventually becoming cinereous, glabrous, and terete, and its golden-lanuginose buds. The petioles are not more than 6 mm. in length, are canaliculate, subtending chartaceous leaf-blades that in young stages are sericeous-lanuginose, golden, and glittering. See *N. latifolia* for discussion.

23. *Nectandra perdubia* Lundell in Lloydia 4: 47. 1941.

DISTRIBUTION: Mexico and Central America, for the most part at fairly low altitudes. Frequently to be found along stream-banks.

MEXICO: Michoacán: Coalcomán, *Hinton 13667* (fr., GH), *13668* (fl., GH), *13856* (fl., GH), *13918* (fl., GH). Oaxaca: Vicinity of San Juan Guichicovi, *Nelson 2725* (fl., fr., Ch); Ubero, *L. Williams 9492* (fl., A, Ch, NY). Tabasco: Boca Cerro, Tenosique, July 1-5, 1939, *Matuda 3576* (fl., ISOTYPE, A, Ch, NY). GUATEMALA: Petén: Uaxactún, *Bartlett 12708* (fl., Ch); Santa Teresa, Subin River, *Lundell 2735* (fr., Ch); La Libertad, *Lundell 3348* (fr., Ch), *3716* (fl., Ch). Alta Verapaz: Vicinity of Secanquim, *Pittier 178* (fl., Ch); vicinity of caves, southwest of Lanquín, *Steyermark 44073* (fr., Ch); along route no. 5 between Chirriacté and Semococh, *Steyermark 46352* (fl., Ch). Izabal: Río Dulce, 2-4 miles west of Livingston, on south side (left hand side going up river), *Steyermark 39538* (fl., Ch). HONDURAS: Copán: Along trail from El Paraiso to La Florida, *Pittier 8468* (fl., NY). BRITISH HONDURAS: Without locality, hill-bank, *Record B.H.30 (Y 8798)* (fr., Y). El Cayo: El Cayo and vicinity, *Chanek 58, 61* (fl., Ch). Belize: Gracie Rock, Sibun River, *Gentle 1692* (fl., A, NY). Stann Creek: In valley, Big Eddy Ridge, *Gentle 3543* (fl., A, NY). COSTA RICA: Puntarenas: Puerto Jimenez de Osa (Golfo Dulce), *Brenes 12163 (642)* (fl., Ch); woods on sea-shore, Golfito de Osa, *Brenes 12314 (793)* (fl., Ch). San José: Near San José, edge of Río Virilla at Uruca, *Tonduz 7271* (Herb. Nat. Costa Rica 10104) (fl., GH, NY). Cartago: Río Turrialba, *J. D. Smith 4932* (fl., GH).

NATIVE NAMES: "Aguacatillo" (Mexico); "Bastard Timbersweet," "Laurel" (British Honduras).

A species near *N. nitida*, according to the author, but distinguished from it by the narrower leaves which are less reticulate and more smooth and shining on the upper surface. The younger branchlets and inflorescences retain their pubescence longer than do those of *N. nitida*. The latter, as well as *N. perdubia*, has the same basic floral structure as is found in *N. salicifolia*.

The species has striate branchlets which are clothed with a minute close brownish-ferruginous tomentum which rubs off early, leaving them dark gray or occasionally darker brown. The leaves are borne on stout tomentose scarcely canaliculate petioles up to 1 cm. long. The lanceolate to elliptic, acuminate to subcaudate, leaf-blades are cuneate at the base and measure up to 17 cm. long and 6 cm. broad. The upper surface is early pubescent, but shining at maturity, the 7-9 lateral nerves diverging at an angle of about 35°, and the costa impressed and not prominent. The lower surface is everywhere minutely pubescent at maturity, with scattered floccose pubescence in addition, particularly about the region of the veins, which

bear more or less pubescent inconspicuous axillary glands beneath. The lateral nerves and costa are prominently elevated beneath and pubescent. The lower surface is definitely but loosely reticulate. The inflorescences are axillary and subterminal many-flowered panicles, densely covered with a minute ferruginous tomentum which becomes less with age. They are subtended by sericeous foliose bracts which presently are deciduous. The flowers are 5.5–7.5 mm. in diameter, the tube short, the elliptic perianth-lobes rather thin or sometimes thickish, fleshy and papillose, up to 3.5 mm. long, tomentose without. The stamens of the two outer series are ± 0.8 mm. long, the subreniform anthers once and a half or twice the length of the stout filaments, which are sometimes pubescent. Those of the inner series are ± 1.25 mm. long and have anthers which are almost square, emarginate, the two upper cells lateral, the lower extrorse. The filaments nearly equal the anthers in length and bear at the base two large subreniform sessile glands nearly the length of the anthers. The staminodia are ± 0.6 mm. long, variable, often triquetrous, the usually somewhat slender stipe nearly half the entire length. The glabrous gynaecium measures ± 1.25 mm., the subglobose ovary constricted at the base and about three times the length of the slender style which bears at its apex a usually conspicuous subcapitate stigma. The fruit (immature?) appears to be small (6.5–10 mm. long and 5.5–8 mm. broad), subglobose, apiculate, subtended by a shallow cyathiform cupule 1.5–3 mm. long, up to 7 mm. in diameter, and less than 2 mm. deep. The slightly enlarged pedicel is up to 5 mm. long and expanded to 3 mm. at the apex.

24. *Nectandra latifolia* (H.B.K.) Mez in Jahrb. Bot. Gart. Berlin 5: 454. 1889.

Ocotea latifolia H.B.K. Nov. Gen. & Sp. 2: 133 [169]. 1817.

DISTRIBUTION: Central America from Nicaragua through Panama, south through Colombia to Brazil, according to Mez.

PANAMA: Canal Zone: Without locality, *Christopherson* 132 (fl., NY); hills near Gatun Station, Panama R.R., Feb. 7, 1860, *Hayes s.n.* (fl., GH, US), 59 (fr., GH); Gatun Lake at turning point from canal, *Bangham* 425 (fr., Ch); Chagres, *Fendler* 54 (fl., Ch, GH, Mo, US); Barro Colorado Island, *Aviles* 113 (fr., Ch), 950 (fl., Ch), *L. H. & E. Z. Bailey* 92 (fl., Ch), 307 (fr., Ch); *Woodworth & Vestal* 692 (fl., A, Ch). [COLOMBIA: Cundinamarca: High plains of Bogotá, *Humboldt & Bonpland* (fr., TYPE not seen).]

This species is very distinct because of its foliage characters. The leaves have petioles 6–12 mm. long, pubescent to glabrous, and canaliculate. The blades, becoming glabrous except for inconspicuous axillary glands, are chartaceous to subcoriaceous, very shining above, dull beneath, elliptic, the base cuneate to roundish, the apex caudate-acuminate, and they measure about 12 (–15) cm. long and 3.5 (–6) cm. broad. The costa and lateral nerves (4–6 pairs) are somewhat obscure above, elevated beneath, and diverge from the costa at an angle of 35–50 (–55)°. The minute reticulation likewise is exceedingly prominent above and beneath. The subcorymbose-paniculate axillary and subterminal branching inflorescences, minutely pubescent, becoming glabrous, measure up to 9 (–13) cm. in length, the peduncle up to 5 cm. long. The flowers measure about 6 mm. in diameter, with thick papillose perianth-lobes, which are elliptic-ovate and ± 2.15 –2.5 (–3.4) mm. long. The stamens of the two outer series are ± 0.6 –0.8 (–1) mm. long, the anthers subreniform, slightly emarginate, twice the length of the rather stout filaments. Those of the inner series are

± 0.8 (-1) mm. long, the squarish anthers about equalling the filaments, which bear conspicuous sessile glands nearly the size of the anthers. The staminodia are ovate, ± 0.6 mm. long, the stipes nearly one-half to two-thirds their entire length. The glabrous gynaecium is ± 1.25 mm. long, the subglobose ovary nearly three times the length of the thick short style that is topped by a subcapitate stigma. The subglobose black fruit is about 1 cm. in diameter and is seated on a shallow cupule not more than 2 mm. long, 6 mm. in diameter, and 0.5 mm. deep, the margin slightly and finely undulate. The pedicel is enlarged to 3–4 mm. long and 2.5 mm. in diameter at the apex.

Mez placed *Fendler 54* under *N. latifolia*, originally described from Colombia, and it seems to agree fairly well with the description. The species *N. nitida*, described from Mexico and the Canal Zone as well, seems to be very close to the so-called *N. latifolia*, differing in leaf-blades that are prominently reticulate above and in the young stage scarcely sericeous beneath, the absence of axillary glands, the branchlets that are sparkling golden-tomentose and the buds that are golden-lanuginose. The flowers also are golden-brown-tomentellous, but their structure is not strikingly different from those of *N. latifolia*. Examination of the types of both species in question is necessary before an accurate disposal may be made of the material at hand.

25. *Nectandra Cufodontisii* (O. C. Schmidt), comb. nov.

Ocotea Cufodontisii O. C. Schmidt in Arch. Bot. Forli 11: 50. 1935.

DISTRIBUTION: Known only from Costa Rica.

COSTA RICA: Alajuela: Alfaro Ruiz, La Brisa de Zarcero, in loam and mold in semi-shade of forest in subtropical zone, *A. Smith H.969* (fl., Ch, NY), *H.972* (fl., A, Ch); Palmira, *A. Smith P.2036* (fl., fr., A). Cartago: On the southwest slope of Volcán Irazú, at the mouth near San Isidro, alt. 2000 m., May 30, 1930, *Cufodontis 315* (fl., fr., ISOTYPE, Ch, photo., Ch, NY) (tree 10 m., with broad crown; flowers greenish).

The young branchlets of this species are angled or almost sulcate, at first subferruginous-sericeous, becoming glabrescent, presently glabrous and grayish. The leaves are borne on canaliculate petioles pubescent and up to 1.5 cm. in length. The blades are elliptic or, according to the author, subovate-lanceolate, acuminate, the base cuneate, chartaceous to subcoriaceous, up to 13 cm. long and 5 cm. broad. The upper surface, according to the author, is somewhat opaque, whereas the lower is almost shining, the entire surface glabrous except for the pubescent axillary glands. The costa and lateral nerves, of which there are 7–9 pairs diverging from the costa at an angle of 35–45°, are very slightly elevated on the upper and more so on the lower surface. The entire surface is conspicuously reticulate. The rather few-flowered axillary or subterminal panicles are minutely subferruginous-pubescent, up to 12 cm. long, and borne on slender pubescent peduncles up to 7 cm. long. The greenish flowers are spreading-campanulate, the heavy fleshy papillose oblong-ovate perianth-lobes measuring up to 3 mm. in length. The stamens of the two outer series are ± 1.5 mm. long, the rounded ovate-globose anthers supported by short stout filaments pubescent at the base and one-quarter the entire length of the stamens. Those of the third series measure ± 1.7 mm. and have anthers that are almost square or subtrapezoid, the filaments almost equalling the anthers and bearing two large conspicuous sessile glands at the base that equal them in length.

The author does not mention the staminodia, which are conspicuous, cordate, ± 0.6 mm. in the type, with the stipes one-half the entire length. Occasionally the staminodia are also biglandular, and occasionally only scale-like. The glabrous gynaecium measures ± 2.15 mm., the subglobose or broadly ovoid ovary more than equalling the stout style, which bears an often conspicuous capitate stigma. The fruit is ovoid-elliptic, up to 2.5 cm. long and about 1.5 cm. broad, borne in a shallow almost disk-like cupule, which is glabrescent, brown, striate (in the dried state), about 2 mm. long, 7 mm. in diameter, and 0.75 mm. deep, the margin undulate. The supporting pedicel is glabrescent, also brown and striate, not more than 4 mm. long and expanded to 2 mm. at the apex.

A fruiting specimen, *Standley 47364* from near San José, has young fruits that resemble those of the type, but the leaves do not show the minute reticulation of those of the latter. Schmidt relates the species to *Ocotea insularis*. To my mind, it is more nearly related to *Nectandra latifolia*, differing in the elliptic acuminate rather than oblong-elliptic caudate leaf-blades, the shorter, ovate-oblong rather than strap-shaped perianth-lobes, and the ovoid-ellipsoid instead of globose fruits.

26. *Nectandra tabascensis* Lundell in *Lloydia* 4: 48. 1941.

DISTRIBUTION: Known only from Mexico.

MEXICO: Jalisco: Santa Cruz de Vallanta, wooded ravine on mountain-side, *Mexia 1264* (fr., GH, NY). Guerrero: Montes de Oca, by the river, *Hinton 10589* (fl., GH), *11473* (fr., GH). Tabasco: La Palma on the San Pedro de Martir River, near the Petén border, Balcan, *Matuda 3299* (fl., ISOTYPE, A, GH, NY).

NATIVE NAMES: "Aguacatillo," "Aguacatillo blanco" (Guerrero).

This species is similar in floral structure to *N. salicifolia* and also to *N. Woodsoniana*. The young branchlets, early fulvous-sericeous-tomentellous, later become glabrescent, dark brown, and striate. The petioles are slender, up to 1 cm. long and sericeous, becoming glabrescent. The leaf-blades are chartaceous, lanceolate-elliptic or lanceolate-oblong, cuneate at the base, the apex acute or subacuminate, sparsely grayish-pubescent throughout, more conspicuously so along the midrib, up to 20 cm. long and 5 cm. broad. The costa and lateral nerves, of which there are 11–13 pairs, are slightly elevated on the upper and more prominently so on the lower surface. The reticulation is loose and conspicuous throughout. The inflorescence is axillary, whitish-pubescent, becoming glabrescent, subcorymbose-paniculate or paniculate, up to 11 cm. long, and subtended by a slender sparsely pubescent peduncle up to 6 cm. long. The flowers are whitish-tomentellous, about 3 mm. long and about 6 mm. in diameter at anthesis, subtended by a slender pubescent pedicel up to 3 mm. long. The perianth-tube is conspicuous and the lobes are slightly unequal, rather fleshy, the outer broadly elliptic or ovate and the inner oblong, ± 2.5 mm. long. The stamens of the outer series are roundish-subreniform, sometimes emarginate, ± 0.75 mm. long, the anthers slightly longer than the stout filaments. Those of the inner series are ± 0.8 mm. long, the squarish anthers about equalling the filaments in length. The filaments bear at the base two subglobose sessile glands nearly the length of the anthers. The broadly ovate staminodia measure ± 0.4 mm. and are borne on short stipes that are about one-third the entire length of the staminodia. The glabrous gynaecium is ± 1 mm. long, the subglobose ovary twice the length of the short stout style that is

topped by a rather inconspicuous stigma. The material from Guerrero and Jalisco does not exactly match the type-collection, but the variation appears to be intra-specific. From *Hinton 11473* and *Gentle 1264*, the fruits seem to be black with a bloom, glabrous, broadly ellipsoid, apiculate, and borne in a shallow sparsely pubescent cyathiform cupule 2 mm. long at most, 7 mm. in diameter, and about 1 mm. deep, with a minutely undulate margin. The subtending pedicel is pubescent, short, and thick, 2–3 mm. long and about 1.5 mm. in diameter at the apex.

The narrower leaves with more numerous lateral nerves and more persistent pubescence separate this species from the Costa Rican and Panamanian *N. Woodsoniana*. The floral structure is very like that of *N. salicifolia*, but the foliage characters are quite different.

27. *Nectandra Loeseneri* Mez in Bull. Herb. Boiss. II. 5: 243. 1905.

DISTRIBUTION: Reported only from type-locality and vicinity in Vera Cruz and adjacent Tamaulipas, along the northeastern coast of Mexico.

MEXICO: Tamaulipas: Coastal dunes north of Tampico, *LeSueur 146* (fl., Ch), *Pringle 7685* (fl., GH); vicinity of Gómez Farias, *E. Palmer 272* (fl., GH). Vera Cruz: Island of Juana Ramirez, about 56 km. south of Tampico, *E. Palmer 458* (fl., GH); vicinity of Pueblo Viejo, 2 km. south of Tampico, *E. Palmer 360* (fr., Ch, GH, NY); in the primeval forest, between Cazonas and Tuxpam, Jan. 4, 1903, *C. & E. Seler 3696* (fl., photo. of TYPE, GH); Cazonas, *Mell s.n.* (fl., NY); Coatzacoalcos, isthmus of Tehuantepec, *C. L. Smith 985* (fl., GH, NY), *1116* (fl., NY).

NATIVE NAME: "Laurel" (Vera Cruz).

The branchlets of this species are slender, glabrous, terete, and, according to Mez, shining. The leaves are borne on slender petioles which are glabrous, canaliculate, and about 1 cm. long. The blades are chartaceous, shining above, elliptic, cuneate at the base and obtuse or shortly and obtusely acuminate at the apex. They measure up to 11 (rarely –17) cm. long and 3–4 (rarely –9) cm. broad, the loose reticulation being prominent on both surfaces. The costa and lateral nerves, of which there are 5–7 pairs, are very slightly elevated above and prominently so beneath. The lateral nerves diverge from the costa at an angle of 25–35 (–45)° and bear in their axils conspicuous pubescent glands. The inflorescence consists of more or less subcorymbose panicles 8–10 cm. long, with few or many flowers, shortly pubescent and borne on long peduncles up to 6 cm. The flowers are about 3 mm. long with a diameter up to 8 mm. The perianth-tube is very short, the lobes oblong-elliptic, ± 3.5 mm. long, rather thick, and papillose on the inner surface. The stamens of the two outer series are ± 0.8 mm. long, with subreniform anthers nearly twice as long as the stout pubescent filaments. Those of the third series are ± 1 mm. long and have anthers which are squarish, emarginate, the two upper cells lateral, the two lower lateral-extrorse, the anthers equalling the filaments in length. The filaments bear two large sessile glands nearly the size of the anthers. The staminodia are small, ± 0.8 mm. long, more or less triquetrous, subtended by stipes pubescent at the base, which are nearly two-thirds the entire length. The glabrous gynaecium is ± 1.4 mm. long, the ovary ellipsoid-ovoid, four times the length of the short stout style with its flat triangular stigma. The fruiting specimen *Palmer 360* seems to match very well the other material. The fruit is globose, apiculate, black in the dried state, about 12 mm. in diameter, subtended by a shallow cyathiform cupule 3 mm. long, 5 mm. broad, and about 1 mm. deep, with a slightly undulating

margin. The pedicel is somewhat slender, up to 5 mm. long and expanded to about 1.5 mm. at the apex.

Although there is only a photograph of the type for comparison, there seems no doubt that the cited numbers may be safely referred to the above species. The nearest relative is *N. salicifolia*. The shape of the leaves and the rather more conspicuous reticulation recall the characters of *N. coriacea*, but in the latter the leaf-blades are more heavily coriaceous and the venation obscured by the reticulation. The floral characters are definitely those of *N. salicifolia*.

28. *Nectandra Skutchii*, sp. nov.

Arbor ad 23 m. alta, ramulis sparse et minutissime ferrugineo-pubescentibus mox atro-rubrescentibus glabris sulcatis angulatis. Folia alternata, petiolis minute adpresse subferrugineo-pubescentibus canaliculatis, ad 1 cm. longis et 2 mm. latis, laminis supra glabris subtus basi costae excepta glabris, membranaceis, in sicco supra pallide viridescentibus subtus minus pallidis, oblongo-ellipticis, ad 20 cm. longis et 6.5 (-7) cm. latis, basi attenuato-cuneatis, in petiolum decurrentibus ibique recurvatis, apice subcaudato-acuminatis, penninerviis, costa utrinque castanea supra impressa subtus valde elevata, nervis 4-6-paribus castaneis, subtus obscuris impressis subtus elevatis arcuatis angulo 35-45° divergentibus, rete venularum utrinque obscuro et leviter subcancellato. Inflorescentia axillaris anguste paniculata, ad 8.5 cm. longa, minute adpresse pubescens, pauciflora, pedunculo ad 2.5 cm. longo. Flores ad 2.5 mm. longi, pedicellis ad 2 mm. longis, pubescentibus, perianthio infundibuliformi, albo, lobis oblongis obtusis reflexis crassis papilloso-tomentosis, ±1.7 mm. longis; staminibus ser. I & II ±0.7 mm. longis, antheris subreniformibus emarginatis filamentis flabeliformibus aequalibus, ser. III ±0.8 mm. longis, obovatis emarginatis biglandulosis, glandulis et antheris filamentis aequalibus; staminodiis ±0.4 mm. longis, stipitatis, subtriquetris; gynaecio glabro ±1.7 mm. longo, ovario globoso 1½ stylo longiore, stigmate conspicuo discoideo. Fructus globosus, apiculatus, in sicco brunneus, ad 10 mm. diam. cupula vadosa et patente subcampanulata conspicue verrucosa tenui erosa leviter undulata glabra 5-6 mm. longa, 10-12 mm. lata, et 3 mm. alta subtentus, pedicello incrassato verrucoso glabro 7-10 mm. longo.

DISTRIBUTION: Known only from Costa Rica, at altitudes of 670-850 m.

COSTA RICA: San José: Vicinity of El General, alt. 850 m., July, 1936, *Skutch 2668* (fl., TYPE — GH, NY) (tree 23 m.; flowers white), *4182* (fr., A, NY).

The affinity of this species is with the *N. globosa* group, in spite of the difference in floral structure, namely the subreniform anthers and the longer style.

29. *Nectandra Standleyi*, sp. nov.

Arbor 6-13 m. alta, ramulis novellis minute et dense fulvo-vel subferrugineo-pubescentibus, angulatis, mox glabrescentibus, striatis griseis vel atro-brunneis. Folia alternata, petiolis satis robustis fulvo-tomentosis canaliculatis ad 1.5 cm. longis, laminis supra minute et inconspicue pubescentibus mox glabris, subtus utrinque minute adpresse pubescentibus, coriaceis, in sicco brunneis, ellipticis, ad 16 (-17) cm. longis et 4.5 (-6) cm. latis, basi obtusis vel subrotundatis imis recurvatis et ut videtur cuneatis, apice attenuato-acuminatis vel caudato-acuminatis, penninerviis, costa

supra impressa subtus elevata, nervis 4 (raro -8)-paribus, supra impressis subtus elevatis, angulo 25-35° divergentibus, rete venularum utrinque obscuro. Inflorescentia axillaris vel subterminalis fulvo- vel griseo-pubescentis, paniculata, multiflora, ad 15 (-20) cm. longa, pedunculo ad 6 mm. longo. Flores ad 3 mm. longi, pedicellis 2 mm. longis pubescentibus, perianthio albo vel fulvo-flavescente, fide coll., campanulato, lobis reflexis carnosis ellipticis rotundatis ± 1.7 mm. longis extus pubescentibus intus papillois; staminibus ser. I & II ± 0.6 mm. longis, antheris subreniformibus submarginatis subsessilibus, ser. III ± 1 mm. longis, antheris truncatis, submarginatis, filamentis aequalibus lateraliter glandulis basi conspicuis subglobosis filamentis subaequalibus; staminodiis subovoideis ± 0.6 mm. longis, stipitibus dimidio aequalibus; gynaecio glabro, ovario stylo paulo longiore, stigmate subtriangulati discoideo conspicuo. Fructus subglobosus 1 (-1.3) cm. diam. (viridis, fide coll.), cupula campanulata glabra verrucosa margine irregulariter vadose lobata, ad 6 mm. longa, 12 mm. diam., et 3 mm. alta subtentus, pedicello robusto verrucoso ad 8 mm. longo et 4-5 mm. diam. apice expanso.

DISTRIBUTION: Costa Rica and adjacent Panama.

COSTA RICA: Alajuela: San Luis de Zarcero, *A. Smith 164* (fl., Ch); region of Zarcero, *A. Smith A.243* (fl., A, Ch, NY); (La Cidra) de San Ramón, *Brenes 3850* (3) (fr., Ch); without precise locality, presumably San Ramón, *Brenes 4061* (fl., TYPE, Ch); Piedades near San Ramón, *Brenes 4344* (fl., Ch); hills of San Pedro de San Ramón, *Brenes 4780* (565), *4794* (579), *5019* (175) (fl., Ch), *5443* (36) (fr., Ch); Cerro de Palma de San Ramón (El Socoro), *Brenes 5714*, *5733*, *5831* (423), *16833* (fl., Ch). San José: La Caja, *Valerio 1326* (fl., Ch). Cartago: El Muñeco, on Río Navarro, *Standley & Torres 50908* (fr., Ch). Limón(?): La Concepcion, Llanuras de Santa Clara, *J. D. Smith 6757* (fr., GH). PANAMA: Bocas del Toro: Cricamola, near Almirante, *G. P. Cooper 488* (fl., Ch, NY); vicinity of Chiriquí Lagoon, Big Bight, *von Wedel 2884*; Isla Colon, *von Wedel 2967* (fl., A).

NATIVE NAMES: "Aguacatillo," "Quizzerá," "Guizarrá quina" (Costa Rica); "Sigua" (Panama).

This species is very similar to *N. globosa* and *N. ramonensis* in foliage-characters, differing from the former in having fewer pairs of lateral nerves, from the latter in having larger leaf-blades, and from both by its smaller flowers with the anthers devoid of the large papillose connective characteristic of the two above-mentioned species. The long stout style, which equals or subequals the length of the ovary and is topped by a conspicuous somewhat triangular discoid stigma, presents further differentiating characters. The fruiting cupule is less shallow in *N. Standleyi* and has a tendency to be subglobose.

The specimens from Chiriquí Lagoon are doubtfully referred to this species, because of the variation in the leaf-shape and the presence of pubescence on the small staminodia.

30. *Nectandra producta*, sp. nov.

Arbor ad 30 m. alta, ramulis argenteo-fulvo-sericeo-pubescentibus striatis valde angulatis. Folia alternata longipetiolata, petiolis conspicue alatis gracilibus vadose canaliculatis pubescentibus ad 5 cm. longis, ut videtur, et ad 3.5 cm. latis, laminis juventute conspicue punctulatis, lucidis, supra glabris subtus minute molliter et inconspicue pubescentibus, membranaceis vel chartaceis, in sicco viridibus, elliptico-lanceolatis vel leviter oblanceo-

lato-ellipticis, ad (8-) 12 cm. longis et 2.5-4 cm. latis, basi attenuato-cuneatis, in petiolum longum decurrentibus ibique valde recurvatis, apice acutis vel attenuato-subacuminatis, penninerviis, costa supra flavescente conspicua subplana et basi pubescente subtus elevata pubescente, nervis ad 10-12-paribus supra tenuibus conspicuis flavescensibus subtus obscuris angulo 45-55° divergentibus. Inflorescentia axillaris paniculata, ad 15 cm. longa, leviter pubescens, multiflora, pedunculo ad 4 cm. longo. Flores 2.5-3 mm. longi, pedicellis ad 3 mm. longis gracilibus glabrescentibus, perianthio campanulato viridescente, lobis late ellipticis obtusis crassis dense papilloso-tomentosis, ± 2.15 mm. longis; staminibus ser. I & II ± 0.8 mm. longis, antheris longis aequidem ac latis filamentis duplo longioribus, ser. III ± 1.4 mm. longis biglandulosis, glandulis et antheris oblongis filamentis aequalibus; staminodiis anguste oblanceolato pubescente ad ± 0.6 mm. longo; gynaecio glabro, ± 2.4 mm. longo, ovario ellipsoideo stylo gracili aequali, stigmate discoideo satis conspicuo. Fructus ignotus.

DISTRIBUTION: Known only from the type-locality, in Costa Rica.

COSTA RICA: San José: In forest in the vicinity of El General, alt. 700 m., Jan. 1939, *Skutch 3906* (fl., TYPE — A, NY) (tree 30 m., with prop-roots; flowers greenish).

Nectandra producta, so-named because of the long apparent petioles, belongs in the same general vicinity with *N. Whitei* and *N. hypoglauca*. The branchlets are rather like those of the latter in that they are thick, angled, and fulvous-sericeous, becoming grayish and striate with age. The leaf-blades are similar in many respects to those of the former species, but are borne on extremely long apparent petioles of 5 cm. in length, formed by the narrowly and conspicuously decurrent leaf-base, being sericeous throughout. Even though the fruit is unknown, the species stands out for its unusual leaves, with the blades narrowly decurrent, forming an apparent petiole of so great a length.

31. *Nectandra Whitei* (Woodson), comb. nov.

Ocotea Whitei Woodson in Ann. Mo. Bot. Gard. 24: 188. 1937.

DISTRIBUTION: Western Panama and Costa Rica, up to 2000 m. altitude.

COSTA RICA: Without locality, *Little 6059* (fr., Ch). Alajuela: Pastures of La Paz de San Ramón, *Brenes 4262 (47)* (fr., Ch). Limón: Inland from Squirres, *Stork 2809 (Y 38450)* (fr., Y). PANAMA: Chiriquí: Valley of the upper Río Chiriquí Viejo, vicinity of Monte Lirio, alt. 1300-1900 m., June 27-July 13, 1935, *Seibert 307* (fl., A, TYPE — Mo, NY) (tree 30 m.; flowers light greenish yellow; fruit green; cupule red; aromatic); trail from Paso Ancho to Monte Lirio, *P. H. Allen 1486* (fr., Ch, GH, Mo, NY).

NATIVE NAMES: "Ira," "Ira rosa" (Costa Rica); "Bambito" (Panama).

The present species has slender branchlets that are minutely and closely fulvo-sericeous, becoming glabrous, grayish, and striate. The actual petioles are slender, glabrous or glabrescent, and about 1 cm. long. The coriaceous blades are oblanceolate, narrowly attenuate at the base and recurved, giving the appearance of a long winged petiole of 3 cm., up to 12 cm. long and 3.5 cm. broad, with the broadest portion above the middle of the blade; the apex is obtuse or obtusely abruptly acuminate. The young leaves are early fulvo-sericeous, becoming glabrous above and less conspicuously pubescent beneath. The costa is slightly elevated above and more prominently so beneath, but conspicuous everywhere. The lateral nerves, of which there are up to 12 pairs, are not very conspicuous and

diverge at an angle of 35–45°. The axillary or subterminal paniculate inflorescence is up to 13 cm. long, subtended by a stout reddish black peduncle up to 6 cm. long. The pubescent light greenish yellow flowers are about 3 mm. long, supported by a slender pubescent pedicel not more than 2 mm. long. The ovate-elliptic lobes are rather thick and ± 2.15 mm. long. The two outer series of stamens are ± 1 mm. long, the subglobose anthers twice the length of the stout filaments. The stamens of the inner series are ± 1.25 mm. long, the squarish anthers almost equalled by the filaments and the two basal sessile subglobose glands. The glabrous gynaecium measures ± 2.15 mm., the ovoid ovary slightly exceeding the rather stout style with its subtriangular flat decurrent stigma. The fruits are oblong or in the younger stages presumably ellipsoid, the apex in the dried state remaining conspicuously shining and unwrinkled, drying in a more or less regular star-shaped pattern, black at maturity, up to 4 cm. long and 1.5 cm. in diameter, the surface frequently tuberculate. The cyathiform red verrucose subtending cupule is up to 6 mm. long, 13 mm. in diameter, and 2–3 mm. deep, the margin gently undulating. The pedicel is verrucose, striate, up to 15 mm. long at times, and 6 mm. in diameter at the apex.

The long fruits distinguish this species from any other from the area under study. It is near *N. Paulii* and *N. producta*, distinguished from the latter by shorter apparent petioles, and from the former by its chartaceous leaf-blades that are much smaller and with more prominent reticulation, and by its shorter inflorescences.

32. *Nectandra hypoglauca* Standley, sp. nov.

Arbor 15–21 m. alta, ramulis fulvo-sericeis, mox griseis, striatis, juventute angulatis. Folia alternata, petiolis alatis robustis pubescentibus, 2 (–2.5) cm. longis et ad 4 mm. latis, laminis supra nitidis glabris basi costae excepta, subtus pubescentibus, glaucis, coriaceis, in sicco olivaceo-brunneis, obovato-ellipticis, ad 18 cm. longis et 8 cm. latis, basi attenuato-cuneatis, in petiolum decurrentibus ibique plus minusve valde recurvatis, apice rotundatis leviter obtuse et abrupte acuminatis, penninerviis, costa supra leviter impressa subtus satis elevata robusta, nervis 6–9 (–10)-paribus supra haud subtus nonnihil elevatis plus minusve castaneis angulo $\pm 40^\circ$ divergentibus, rete venularum supra utrinque conspicuo. Inflorescentia axillaris, juvenili bracteis adhuc onusta, paniculata, ad 18 cm. longa, dense fulvo-tomentosa, longipedunculata, pedunculis robustis striatis angulatis ad 8 cm. longis. Flores dense fulvo-tomentosi, ± 3.5 mm. longi, pedicellis ad 4 mm. longis tomentosus, perianthio campanulato, canescente fide coll., fulvo-tomentoso, lobis ovatis obtusis crassis, ± 2.5 mm. longis; staminibus ser. I & II ± 1 mm. longis, antheris ovatis, connectivo antherae $\frac{1}{3}$ longitudine aequante filamento duplo longioribus, ser. III ± 1.25 mm. longis biglandulosis, antheris oblongis truncatis glandulis filamentisque duplo longioribus; staminodiis lato-lanceolatis ± 0.75 mm. longis; gynaecio glabro ± 1.7 mm. longo, ovario ovoideo-globo stylo duplo longiore, stigmatate peltato conspicuo. Fructus in sicco flavescenti-brunneo-maculatus, obovoideo-ellipticus, conspicue et obtuse apiculatus, 2.2×2 cm., cupula campanulata rugosa verrucosa glabra margine leviter undulata, ad 1 cm. longa, 1.7 cm. diam., et 5 mm. alta subtentus, pedicello incrassato glabro, ad 15 mm. longa apice ad 5 mm. lata.

DISTRIBUTION: Known only from the type-locality, in Panama.

PANAMA: Chiriquí: Bajo Mono, Boquete, in rain-forest, alt. 1340 m., April 9, 1938, *Davidson 531* (fl., Ch, TYPE—Mo; fr., A, Ch) (tree 15–21 m.; flowers white).

Nectandra hypoglauca is similar to *N. Whitei* and *N. producta*, which see for discussion.

33. *Nectandra Paulii*, sp. nov.

Arbor ad 30 m. alta, ramulis robustis sulcatis minute fulvo-tomentosis mox griseo-pubescentibus vel glabrescentibus. Folia alternata juventute sparse adpresse minute fulvo-pubescentia mox glabrescentia demum glabra, petiolis robustis pubescentibus vadoso canaliculatis ad 2 cm. longis et 4 mm. latis, laminis supra utrinque glabris basi costae excepta, subtus minute pubescentibus, juventute membranaceis mox coriaceis, in sicco supra viridescenti-brunneis, subtus pallidioribus subglaucis, ellipticis vel obovato-ellipticis, ad 15 cm. longis et 7 cm. latis, basi cuneatis, in petiolum decurrentibus ibique satis recurvatis, apice acutis, acuminatis, vel rotundatis, raro emarginatis, margine leviter recurvatis, penninerviis, costa robusta supra conspicua subtus valde elevata, nervis (6–) 7–8 (–9)-paribus supra conspicuis sed leviter impressis, subtus elevatis angulo 35–45° divergentibus, rete venularum utrinque obscuro. Inflorescentia axillaris, late paniculata, ad 30 cm. longa, pubescens, multiflora, longipedunculata, pedunculo robusto pubescente, ad 10 cm. longo. Flores ad 3 mm. longi, pedicellis 1–3 mm. longis gracilibus, perianthio hypocrateriformi albo, fide coll., lobis oblongis, reflexis, crassis, papilloso-tomentosis, ±2.5–3 mm. longis; staminibus ser. I & II ±0.6 mm. longis, antheris subreniformibus vel depressoglobosis filamento duplo longioribus, ser. III ±0.8 mm. longis conspicue biglandulosis, glandulis et antheris quadratis filamentis aequalibus; staminodiis oblanceolatis pubescentibus ±0.6 mm. longis; gynaecio glabro, ±1.25 mm. longo, ovario subgloboso, stylo subnullo, stigmatate subsessili rotundato conspicuo. Fructus ellipsoideus, apiculatus, 28 × 17 mm., cupula rubra campanulata crassa verrucosa glabra ad 8 mm. longa, 15 mm. diam., et 5 mm. alta subtentus, pedicello incrassato pubescente striato, ad 1 cm. longo et apice 8 mm. lato.

DISTRIBUTION: In Costa Rica, up to 915 m. altitude, and in Chiriquí Province of Panama, at 1500–2000 m. altitude.

COSTA RICA: San José: Forests in the vicinity of El General, alt. 915 m., Feb. 1936, *Skutch 2605* (fl., TYPE—A, GH, NY) (tree 30 m.; flowers white). PANAMA: Chiriquí: Bajo Mono, mouth of Quebrada Chiquero, along Río Caldera, *Woodson, Allen & Seibert 1022* (fr., A, Ch, Mo, NY); vicinity of Cerro Punta, *Paul H. Allen 1572* (fr., Ch, GH, Mo).

The lack of well developed connective tissue of the outer series of anthers, and the sessile stigma and globose ovary distinguish the flowers of *N. Paulii* from those of *N. hypoglauca*. The fruiting pedicel is shorter than that of *N. hypoglauca*, and the fruit is ellipsoid rather than obovoid-ellipsoid.

34. *Nectandra belizensis* (Lundell), comb. nov.

Phoebe belizensis Lundell in Contr. Univ. Mich. Herb. 6: 20. 1941.

DISTRIBUTION: Known only from the type-locality and vicinity, in British Honduras.

BRITISH HONDURAS: Stann Creek: Creek-side, Mountain Cow Ridge, *Gentle 3281* (fr., A, NY); Mountain Cow Ridge, in high ridge, March 31, 1940, *Gentle 3304* (fl., ISOTYPE, A, NY) (tree 25 cm. diam.; flowers white); Big Eddy Ridge, *Gentle 3346* (fr., A, NY).

NATIVE NAMES: "Timbersweet," "White laurel" (British Honduras).

This tree, described under the genus *Phoebe*, certainly resembles the latter genus in habit-characters, particularly the species *P. helicterifolia*. The softly ferruginous-tomentose young branchlets and petioles are characteristic, as well as the oblong chartaceous to subcoriaceous pale leaf-blades with the rounded bases and abruptly and sharply acuminate apices. The blades are 11–22 cm. long and up to 8.5 cm. broad. The costa is impressed above and retains its early pubescence, whereas the lateral nerves, of which there are 6–8 pairs, are merely impressed, diverging at an angle of 45–55°. The reticulation, which is also impressed above and not too conspicuous, stands out prominently beneath. The few-flowered axillary inflorescences are up to 10 cm. long and borne on slender softly pubescent peduncles up to 5 cm. long. The white flowers are about 8–9 mm. in diameter, the thick ovate lobes up to 3 mm. long and pubescent without. The stamens of the two outer series are ± 0.8 mm. long, the broadly obovate anthers are nearly sessile, and the connective is slightly prominent. Those of the inner series are ± 1.25 mm. long, subrectangular, the large conspicuous glands equalling the filaments and anthers in length. The staminodia are thin, triangular, less than 0.4 mm. long. The glabrous gynaecium measures ± 1.25 mm. long; the subglobose ovary is topped by a very short style bearing an inconspicuous discoid stigma. The fruit is glabrous, ellipsoid, apiculate, up to 1 (–1.3) cm. long and 6 (–?) mm. broad, the thin shallow pubescent to glabrescent cupule not more than 4 mm. long and about 5 mm. in diameter, the slender pubescent to glabrescent pedicel from 5 mm. to 1 (–1.7?) cm. long.

The lack of conspicuous staminodia, the short-styled globose ovary, the form and development of connective-tissue in the anthers, and the shape of the anthers themselves all seem to point to the fact that this species should be included under *Nectandra*. The fruits of the numbers cited above appear to be immature.

35. *Nectandra rudis*, sp. nov.

Arbor(?), ramulis angulatis atro-brunneis verruculosi minute et obscure pubescentibus. Folia alternata, petiolis robustis glabrescentibus haud canaliculatis, ad 3 cm. longis et 4 mm. latis, laminis utrinque glabris percoriaceis in sicco brunneis, supra nitidis, ellipticis, ad 20 cm. longis et 8 cm. latis, basi cordatis recurvatis, apice ignotis, penninerviis, costa supra rubescente et leviter impressa subtus conspicue elevata, nervis ad 10-paribus supra rubescentibus leviter elevatis subtus elevatioribus angulo 35–45° divergentibus, rete venularum supra conspicuo subtus obscuro. Inflorescentia axillaris et subterminalis late paniculata, ad 13 cm. longa, minute adpresse pubescens, multiflora, pedunculo robusto ad 5 cm. longo. Flores ad 6 mm. longi, dense ferrugineo-pubescentes, pedicellis pubescentibus satis robustis ad 5 mm. longis, perianthio late campanulato, lobis late ellipticis obtusis (mox reflexis) crassis papilloso-tomentosis ad 4 mm. longis; staminibus ser. I & II ± 1.25 mm. longis antheris subglobosis filamentis basi pubescente duplo longioribus, ser. III ± 1.25 mm. longis biglandulosis, antheris oblongis, glandulis aequalibus, longitudine $\frac{2}{3}$ staminium aequantibus; staminodiis nullis; gynaecio glabro ± 1.7 mm. longo, ovario globoso brevistipitato stylo approx. duplo longiore, stigmatibus parvis discoideis. Fructus ignotus.

DISTRIBUTION: Known only from type-locality.

MEXICO: Chiapas: Mt. Ovando, Dec. 29, 1936, *Matuda* 470 (fl., TYPE, A).

This robust species, known only from the flowering specimen, seems to be distinct enough to warrant description without fruiting material. It is perhaps most nearly related to *N. sinuata*, in spite of the glabrous leaves and ovary and the roundish stamens with very little connective tissue protruding at the apex of the anthers.

36. *Nectandra platyphylla* (Lundell), comb. nov.

Phoebe platyphylla Lundell in Contr. Univ. Mich. Herb. 6: 23. 1941.

DISTRIBUTION: Known only from the type-locality, in Mexico.

MEXICO: Chiapas: Finca Suiza near Montecristo, Jan. 1938, *Matuda* 1930 (fl., ISOTYPE, A, NY).

The branchlets of this tree are angled, at first dark and minutely puberulous, later becoming glabrous, terete, striate, and often grayish. The pedicels are rather slender, canaliculate, puberulous, and up to 1.5 cm. long. The membranaceous leaf-blades are yellowish green, at first minutely sericeous, becoming quickly glabrescent on both surfaces except for the frequent presence of pubescent axillary glands beneath. They are oblong-elliptic or obovate-elliptic, the base rounded and often abruptly cuneate with a tendency toward recurving, the apex obtuse or obtusely acuminate or occasionally acutish, and measure 9–25 cm. long and 4.5–11.5 cm. broad. The costa is slender, impressed above and somewhat elevated beneath. The lateral nerves, of which there are 6–12 slender pairs, are only slightly elevated above and little more beneath, visible but not conspicuous, and diverge at an angle of about 45°. (The isotype has leaves on the whole much smaller than the length and breadth given by Lundell.) The inflorescence is axillary, glabrous or at least glabrescent, up to 10 (–15) cm. long, few-flowered, the slender dark brownish red peduncle up to 6 cm. long. The white flowers are large, about 1 cm. in diameter, supported by filamentous pedicels up to 1 cm. long. The lobes are 4 (–5) mm. long, broadly elliptic, obtuse to rounded, fleshy, papillose, the tube short. The stamens of the two outer series are ± 2.15 mm. long, with sessile anthers elliptic, obtuse, and petaloid. Those of the inner series have anthers that are subrectangular, rounded, and borne on filaments about one-third their length and completely covered by two conspicuously large glands that are as large as the anthers. The staminodia are subtriquetrous, stipitate, ± 1 mm. long. The glabrous gynaecium is ± 2.15 mm. long, compressed-globose, with a very short thick style topped by a triangular conspicuous stigma.

Lundell places this near *Phoebe ambigens*, from which it may be distinguished by leaf-blades that are more frequently obovate-elliptic than elliptic, membranaceous rather than subcoriaceous, and by smaller flowers, the styles of which are extremely short.

37. *Nectandra sinuata* Mez in Jahrb. Bot. Gart. Berlin 5: 402. 1889; Standley in Contr. U. S. Nat. Herb. 23: 297. 1922; Standley & Calderón, Lista Prelim. Pl. Salvador 84. 1925; Standley in Field Mus. Publ. Bot. 18: 453. 1937.

Persea Matudai Lundell in Lloydia 4: 49. 1941.

DISTRIBUTION: Southern Mexico through Central America.

MEXICO: Oaxaca: Vicinity of Cafetal Concordia, *Morton & Makrinus* 2486 (fr., Ch); Cafetal San Antonio, Pochuntla, *Reko* 6039 (fl., GH). Chiapas: Las

Cadenas, Escuintla, January 5, 1938, *Matuda 1880* (fl., isotype of *Persea Matudai*, A, Ch, NY). GUATEMALA: Quezaltenango: Coffee plantations, Colomba, *Skutch 1978* (fl., A, NY); Finca Pirineos, lower south-facing slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, *Steyermark 33234* (fl., Ch). Zacapa: Trail between Santa Rosalía de Mármol and Vegas, *Steyermark 42961* (fl., Ch). Chiquimula: Around the crater-lake, Volcán de Ipala, *Pittier 1874* (fl., GH). Guatemala: Near Finca La Aurora, *Aguilar 279* (fr., Ch). Sacatepéquez: Near Barranco Hondo, southeast of Alotenango, dry thicket, *Standley 64949* (fl., A, Ch). Retalhuleu: Near Retalhuleu, *Bernoulli & Cario 2581* (fl., TYPE of *Nectandra sinuata* not seen). Suchitepéquez: Finca Mocá, *Skutch 1489* (fl., Ch); *Bequaert 55* (fr., Ch, GH). Santa Rosa: Chiapas, *Heyde & Lux 4374* (fl., GH, NY). HONDURAS: Dept. unknown, Cerro del Guayabal, *S. Calderón 2012* (fl., GH). Ahuachapán: Vicinity of Ahuachapán, along stream, *Standley 19959* (fl., GH, NY); Sierra de Apaneca, in the region of Finca Colima, *Standley 20095* (fl., GH, NY). EL SALVADOR: San Salvador: Volcán de San Salvador, *S. Calderón 473* (fl., GH), *Standley 22968* (fl., GH, NY); cerro de San Jacinto, *S. Calderón 2248*, *Standley 20629* (fl., GH, NY). La Paz: Zacatecoluca, *S. Calderón 308* (fr., GH, NY). COSTA RICA: Alajuela: San Pedro de San Ramón, *Brenes 6817*, *15090* (fl., Ch); San Francisco de Guadalupe, *Pittier 12348* (fr., Ch, GH); Naranjo, Cerro del Espíritu Santo, in thicket in reddish clay-loam of Pacific tropic zone, *A. Smith P.2409* (fl., A); Alajuela, *J. D. Smith 6754* (fl., GH, NY). San José: About the Hacienda Belmira, near Santa María de Dota, *Tonduz 11651* (fl., Ch, GH). Cartago: Near Cartago, *Skutch 4687* (fl., A, NY).

NATIVE NAMES: "Aguacamico," "Aguacate amarillo," "Aguacate de mico" (El Salvador); "Aguacatillo" (Mexico); "Chipinahuaca," "Palo de Chipinahuaca" (El Salvador); "Palo de Tejón" (Mexico); "Quisarrá," "Quisarrá hedionda" (Costa Rica); "Tepeaguacate rojo" (Guatemala); "Trompillo," "Trompito" (El Salvador).

This is a very well known species occurring throughout most of Central America and adjacent Mexico. The stout angled branchlets are clothed with a fulvous or grayish tomentum. The densely tomentose pedicels are somewhat canaliculate, robust, and up to 3 cm. long. The oblong-elliptic or obovate blades are cordate at the base, the apex subobtuse, rounded or abruptly subacuminate or abruptly and sharply acuminate, 25 (-30) cm. long and 12 (-19) cm. broad, chartaceous, densely grayish- or fulvous-tomentose beneath and more sparsely pubescent above, the costa and nerves heavily tomentose. The costa and slender lateral nerves, of which there are 9-11 (-15) pairs diverging at an angle of 45-70 (-80)° (the lowermost almost at right angles), are conspicuous above because of their pubescence and are prominently elevated as well as pubescent beneath. The inflorescence is a stout subcorymbose or pyramidal many- or few-flowered axillary panicle, usually densely pubescent, up to 25 cm. long, the robust peduncle up to 16 cm. long. The large flowers are up to 1 cm. long and nearly 2 cm. in diameter, the tomentose pedicels 5-10 (-12) mm. long. The fleshy lobes are densely tomentose without and heavily papillose within, broadly ovate or elliptic, subacute to obtuse or round, reflexed at anthesis and in the dried state castaneous or occasionally dark brown. The two outer series of stamens are 3 mm. long, the elliptic or ovate anthers sessile or subsessile, usually variously petaloid, heavily papillose, the fleshy connective tissue of the anthers occupying at least one-third of their entire length. The stamens of the inner series are $\pm 3.4-4$ mm. long, oblong-truncate, the cells sublaterally extrorse and the filaments with conspicuous sessile basal glands about one-third the length of the stamens. The usually densely pubescent (sometimes glabrous) gynaecium is ± 3 mm. long, the

subglobose ovary equalling in length the stout style with its conspicuous subtriangular decurrent stigma. The ellipsoid fruit measures up to 2.5 cm. long and 17 mm. in width, the supporting campanulate glabrescent to glabrous cupule measuring up to 13 mm. long, 2.5 cm. in diameter, and about 10 mm. deep, the pedicel enlarged to 13 mm. long and about 11 mm. diameter at the apex. In the dried state the cupule flares away from the fruit instead of surrounding it closely. The upper half of the fruit is glabrous except for the entire tip, which is covered with persistent pubescence. Approximately the lower third to half, which is almost entirely hidden by the cupule, is densely fulvous-sericeous-tomentose.

The above description is applicable to the majority of specimens of the species. All of the material from San Salvador shows flowers with glabrous ovaries. Some of the Guatemalan specimens are less tomentose as to foliage and inflorescence in general. Nonetheless, it is apparent that they all belong under the same widely variable species.

38. *Nectandra reticulata* (Ruiz & Pavon) Mez in Jahrb. Bot. Gart. Berlin 5: 404. 1889; Standley in Contr. U. S. Nat. Herb. 23: 297. 1922, in Field Mus. Publ. Bot. 18: 453. 1937.

Laurus reticulata Ruiz & Pavon, Fl. Peruv. Chil. 4: t. 348, & Laurogr. t. 23. 1802.

DISTRIBUTION: Tropical America from Mexico into Central and South America.

MEXICO: Puebla: Zonquimistlan, C. & E. Seler 3643 (fl., GH). Oaxaca: Chiltepec and vicinity, Tuxtepec, in llanos, Martínez-Calderón 488 (fl., A). Chiapas: Escuintla, Matuda 383 (fl., A, NY). GUATEMALA: Alta Verapaz: South of Cubilgüitz, in thickets, Steyermark 44561 (fl., Ch); Hacienda Yaxcabnal, Steyermark 45093, 45094 (fl., Ch); Cubilgüitz, von Tuerckheim 7965 (fl., GH, NY). Quezaltenango: Colomba, in coffee plantations, Skutch 1988 (fl., A, NY). Retalhuleu: Retalhuleu, Kellerman 6587 (fl., Ch); vicinity of Las Delicias, south of Retalhuleu, Standley 88121 (fl., Ch); vicinity of Retalhuleu, Standley 88822 (fl., Ch). HONDURAS: Mosquitia(?): Black River Valley, Record & Kuylen H. 69 (Y 10015) (fl., Y). NICARAGUA: Bluefields: Region of Braggman's Bluff, Englesing 65,123 (fl., Ch). COSTA RICA: Alajuela: San Pedro de San Ramón, Brenes 6586 (fl., Ch), Tonduz 17692 (fl., Ch). San José: Vicinity of El General, in clearings, Skutch 2490 (fl., A, NY). PANAMA: Bocas del Toro: Changuinola Valley, Island Potrero, Dunlap 22a (fl., Ch); Changuinola Valley, G. P. Cooper 32 (Y 10132) (fr., Ch); region of Almirante, Cricamola along river, Cooper & Slater 512 (fr., Ch). Canal Zone: Forest along the Rio Indio de Gatun, Pittier 2775 (fl., GH, NY); in swampy woods, Lion Hill Station, Hayes 467 (fl., US); Mindi, Cowell 182 (fl., NY). [PERU: Without locality, Pavon 504 (fl., ISOTYPE of *Laurus reticulata*, Ch).]

NATIVE NAMES: "Aguacatilla" (Honduras); "Chuala" (Guatemala); "Sweetwood" (Panama).

This widespread species is conspicuous for its densely ferruginous-tomentose branchlets and inflorescences. The stout petioles, up to 1.5 cm. long, as well as the lower surface of the leaf-blades, are densely tomentose. The blades are coriaceous, glabrous above except for the venation, lanceolate-elliptic or oblong-elliptic, the base auriculate and strongly recurved, the apex attenuate-acuminate, sometimes up to 30 cm. long, and as broad as 9 cm. The costa and lateral nerves are impressed and pubescent above, prominently elevated and densely pubescent beneath. The lateral nerves number up to 12 pairs and diverge at an angle of 35–45°. The reticulation is pronouncedly impressed above and conspicuously elevated beneath. The inflorescence is stout, axillary, many-flowered, ferruginous-tomentose, paniculate, usually with long peduncles up to 10 cm. long. The densely

tomentose flowers are large, up to 7 cm. or more long and 10–15 mm. in diameter, the pedicel 4–5 mm. long, often less. The inner surface of the tube is frequently densely hairy. The fleshy tomentose lobes are ovate, obtuse or rounded, and papillose within, measuring nearly 6 mm. long, the inner being slightly shorter than the outer. The stamens of the two outer series are variable in size, up to ± 2.4 mm. long, and the almost sessile anthers vary in size from depressed-globose to ovate and almost petaloid, the connective tissue occupying usually about half the length of the anther. The stamens of the inner series are also variable in length, up to ± 2.5 mm., the anthers often squarish and emarginate or occasionally ovate; the filaments are sometimes almost equal in length to the anthers and always bear conspicuous spreading sessile glands at the base, nearly equal to the anthers in length. The linear-lanceolate staminodia are usually hairy, and are ± 0.8 mm. long. The gynaecium is 3 mm. or under in length, and is for the most part densely pubescent, although in some cases it may be glabrescent or even glabrous. The ovate or ellipsoid ovary is slightly longer than the stout style, which is topped by a conspicuous subcapitate stigma. The fruit, of which I have no material at hand, is presumably ellipsoid, up to 13 mm. long and 8 mm. broad, subtended by a simple-margined cupule that is slender and subpateriform, and one-third the length of the fruit.

Although the specimens from Mexico and Central America vary considerably from each other and from the type from Peru, there seems no reason for setting them up as a new species. Kostermans (Meded. Bot. Mus. Utrecht 25: 19. 1936) mentions the close relationship between *N. Laurel*, *N. rigida*, and *N. reticulata*, giving the densely sericeous-hirsute inner surface of the tube of the latter as a diagnostic character. Many of the specimens cited above are intermediate in this as well as other characters. All gradations of leaf-base, shade of pubescence, and internal floral structure are apparent in the material at hand. Eventually further study of South American collections may reveal different trends and make another disposition of the North and Central American specimens advisable.

DOUBTFUL SPECIES AND VARIETIES OF NECTANDRA

Nectandra mollis γ *venosa* Meissner in DC. Prodr. 15¹: 149. 1864.

This variety, described from Mexico, Central America, and South America, Mez reduces to *Nectandra reticulata* (Ruiz & Pavon) Mez. None of the syntypes are at hand for comparison; they include Oersted's collection from Costa Rica and *Schiede & Deppe 243* from Mexico.

Nectandra mollis β *villosa* Meissner in DC. Prodr. 15¹: 148. 1864.

This also is reduced by Mez to *Nectandra reticulata* (Ruiz & Pavon) Mez. The syntypes, from Mexico (*Schiede & Deppe 241, 1145*) and South America, are unavailable at present.

Nectandra polita β ? *Oerstedii* Meissner in DC. Prodr. 15¹: 164. 1864.

The type, *Oersted 12*, from Nicaragua, has not been seen; Mez includes the variety under *Nectandra latifolia*.

Nectandra turbacensis γ *mexicana* Meissner in DC. Prodr. 15¹: 152. 1864.

Mez reduces this to *Nectandra rectinervia* Meissner. The syntypes, *Linden 16* and *Galeotti 7101*, from Mexico, are not available.

Nectandra amazonum var. δ *Oerstedii* Meissner in DC. Prodr. 15¹: 150. 1864.

The syntypes presumably are the numbers cited by Mez, under *Nectandra globosa*, *Oersted* 16, 17, 18, from Costa Rica. So far, they have not been available for study.

SPECIES EXCLUDED FROM NECTANDRA

Nectandra chiapensis Lundell = OCOTEA CHIAPENSIS (Lundell) Standley & Steyermark.
Nectandra striata Nees = MYRODIA cf. FUNEBRIS L. (ex Gürke), fide Mez.

5. *Litsea* Lamarck

Litsea Lamarck, Dict. 3: 574. 1791; Hemsley, Biol. Centr. Am. Bot. 3: 76. 1882; Mez in Jahrb. Bot. Gart. Berlin 5: 474. 1889; Bartlett in Proc. Amer. Acad. 44: 597. 1909.

Tetranthera Jacquin, Hort. Schoenbr. 1: 59, t. 113. 1797; Meissner in DC. Prodr. 15¹: 177. 1864.

Malapoenna Kuntze, Rev. Gen. 2: 571. 1891.

DISTRIBUTION: In mountain-forests of Mexico and Central America.

Small trees or shrubs not more than 6 m. high, with leaves lanceolate to elliptic with all intermediate forms, not more than 13 and usually less than 10 cm. long, or leaves ovate to orbicular and not more than 7 cm. long. The diagnostic character, however, lies in the dioecious flowers borne in small axillary subumbellate clusters on peduncles of varying lengths, usually not more than 2 cm., surrounded by an involucre that is quickly deciduous at anthesis. The floral parts are extremely variable in this unstable group, but in the main there are six perianth-lobes, occasionally aborted to fewer, equal or subequal in length. The δ flower usually bears three or four series of fertile stamens, the two inner of which are biglandular. The anthers are four-celled and are all introrse, though very occasionally in the inner cycles the lower locules appear to be lateral. A small aborted ovary may occur or be absent entirely. The φ flower has three or four series of three each of staminodia, the first two of which are usually without glands. The third and fourth, if present, bear at the base of the filament two glands which are often stipitate. The ovary is well developed in the φ flower. The fruit is a more or less globular berry, seated on a small scarcely changed perianth-tube, or on one that is thickened and enlarged to form a cupule or disc, which is seated on the enlarged pedicel.

The genus *Litsea* in America presents a pattern different from that of other genera of this hemisphere. There are two morphologically distinct divisions: first the group consisting of three species with leaves ovate or ovate-lanceolate to orbicular-ovate, showing bases rounded or subcordate, found only in Coahuila, Nuevo Leon, and San Luis Potosí; second, embracing the remainder of the genus, the group with leaves elliptic, lanceolate, linear, or oblong and all variations thereof, their bases not subcordate nor rounded, occurring from Chihuahua and Sinaloa south and east throughout Mexico and Central America.

KEY TO THE SPECIES OF LITSEA

A. Leaf-bases rounded or subcordate.

- B. Young branchlets densely ferruginous-pubescent; lower surface of leaves tomentose; petioles pubescent; inflorescence densely ferruginous-pubescent; infructescence not more than 1.5 cm. long; fruit ± 5 mm. long.....1. *L. Muelleri*.
- B. Young branchlets glabrous or at most glabrescent; lower surface of leaves and petioles glabrous; inflorescence glabrous or glabrescent; infructescence not less than 1.5 cm. long; fruit 1 cm. or more long.
 - C. Leaf-blades ovate-lanceolate, the largest up to 7 cm. long, the apex acute.....2. *L. Pringlei*.
 - C. Leaf-blades ovate or orbicular-ovate, the largest up to 4 cm. long, the apex acute, obtuse, or rounded.....3. *L. parvifolia*.
- A. Leaf-bases not rounded or subcordate.....4. *L. glaucescens*.
 - B. Branchlets, petioles, and venation not conspicuously flavescent.
 - C. Leaf-blades usually oblong-elliptic or ovate-elliptic, glabrous to densely tomentose.....4a. *L. glaucescens* var. *subsolitaria*.
 - C. Leaf-blades linear or at most linear-lanceolate to oblong, always glabrous.....4b. *L. glaucescens* var. *Schaffneri*.
 - B. Branchlets, petioles, and venation conspicuously flavescent.....4c. *L. glaucescens* var. *flavescens*.

1. *Litsea Muelleri* Rehder in Jour. Arnold Arb. 16: 449. 1935.

Litsea Tharpiana Standley in Field Mus. Publ. Bot. 17: 247. 1937.

DISTRIBUTION: Mountains of Nuevo Leon, Mexico, at an altitude of 1500–2600 m.

MEXICO: Nuevo Leon: Sierra Madre Oriental, common in dense woods east side of divide, between San Francisco Canyon and Pablillo, 15 miles s.w. of Galeana, alt. 2600 m., May 14, 1934, C. H. & M. T. Mueller 379 (δ fl., TYPE of *L. Muelleri*—A, Mich, NY, Tex, US); Hacienda Pablillo, Galeana, August 18, 1936, Taylor 188 (fr., type of *L. Tharpiana*, δ fl., Tex); cañon above Alamar, C. H. & H. T. Mueller 689 (fr., A, Mich, NY, Tex, US).

This species is easily separated from the other species of *Litsea* with rounded or subcordate leaf-bases by the occurrence of a dense persistent pubescence on the young branchlets and petioles and a tomentum on the lower surface of the leaf-blades. The nearest relatives are to be found in the *L. parvifolia* complex, from Nuevo Leon and Coahuila, but separated by the ferruginous (sometimes becoming fuscous) pubescence on the young branchlets, and by the venation of the lower leaf-surface. On the whole, the lateral nerves are more ascending in *L. Muelleri*, the petioles longer and densely hairy, and the leaf-bases less pronouncedly cordate. The two entities described undoubtedly represent the same species.

2. *Litsea Pringlei* Bartlett in Proc. Amer. Acad. 44: 598. 1909; Standley in Contr. U. S. Nat. Herb. 23: 287. 1922.

Litsea novoleontis Bartlett in op. cit. 601; Standley in op. cit. 288.

DISTRIBUTION: Ridges in the Sierra Madre near Monterrey, Nuevo Leon, and in southwestern San Luis Potosí.

MEXICO: Without locality, April, 1926, Runyon & Tharp 893, 1008 (sterile, fr., Tex). Nuevo Leon: Municipio de Villa Santiago, Cañon Marisio Arriba, Rancho Las Adjuntas, C. H. Mueller 2042 (fr., GH); Cañon Diente, near Monterrey, C. H. Mueller 2662 (fr., GH); Sierra Madre Oriental, waterway below Alamar, about 15 miles s.w. of Galeana, C. H. & M. T. Mueller 620 (fr., NY, Tex, US); near Monterrey, Pringle 2078 (fr., GH), 2837 (fr., type of *L. novoleontis*, GH); limestone ledges, Sierra Madre above Monterrey, alt. 800 m., March 8, 1906, Pringle 10238 (δ , η fl., TYPE of *L. Pringlei*—GH, NY, US) (shrub 1.3–2 m.), Tharp 1835 (η fl., Tex, US). San Luis Potosí: Alvarez, Sept. 5–10, 1902, E. Palmer 62 (δ fl., fr., GH, NY, US); mountains, San José Pass, August 5, 1890, Pringle 3146 (fr., NY, US).

NATIVE NAMES: "La Brel" (Nuevo Leon); "Laurel" (San Luis Potosí).

This shrub, 1.3–2 m. high, bears furcate branchlets which are densely or sparsely leafy and are reddish black or olivaceous in color. The coriaceous reticulate ovate-lanceolate leaf-blades are extremely variable in size, becoming as long as 7 cm., their tips often mucronulate, and their bases rounded to subcordate. The ♂ inflorescences are variable, which fact accounts for the description of the two species *L. Pringlei* and *L. novoleontis* from the same locality. In the former the 1–4 erectly pedunculate subumbellate ♂ inflorescences occur principally in the axils of terminal leaves, giving an appearance of dense flower-clusters. The ♂ inflorescences of the specimens described as *L. novoleontis* are single, axillary, and borne on slender nodding peduncles. The fruit is black, globose, about 11 mm. in diam., subtended by an expanded pedicel about 5 mm. long, and ± 4 mm. in diam. The peduncle is only slightly enlarged.

3. *Litsea parvifolia* (Hemsley) Mez in Jahrb. Bot. Gart. Berlin 5: 481. 1889; Bartlett in Proc. Amer. Acad. 44: 601. 1909; Standley in Contr. U. S. Nat. Herb. 23: 288. 1922.

Umbellularia parvifolia Hemsley, Biol. Centr. Am. Bot. 3: 77. 1882.

Malapoenna parvifolia Kuntze, Rev. Gen. 2: 571. 1891.

Litsea pedicellata Bartlett in Proc. Amer. Acad. 44: 598. 1909; Standley in Contr. U. S. Nat. Herb. 23: 287. 1922.

DISTRIBUTION: Mountains near Saltillo, Coahuila, and Monterrey, Nuevo Leon.

MEXICO: Coahuila: Abundant in mountains near Saltillo, July 30, 1848, Gregg 314 (♀ fl., fr., ISOTYPE of *Umbellularia parvifolia*, GH) (shrub 1.5–3 m. tall); April 15–30, 1898, E. Palmer 68 (♂ fl., GH), alt. 2100 m., April 12, 1906, Pringle 10239 (♂ fl., type of *L. pedicellata* — GH, NY, US) (shrub 1.3–1.5 m.). Nuevo Leon: Monterrey, C. H. & M. T. Mueller 301 (♀ fl., fr., Tex).

This is the earliest species of *Litsea* to be described from northern Mexico. The shrub, 1.3–3 m. in height, has ovate-lanceolate to orbicular leaf-blades, minutely mucronulate at the apex and rounded, subcordate or cordate at the base, more or less coriaceous, and heavily reticulate, not more than 4 (usually 3) cm. long. Characteristic is a bloom discernible on leaf-blade, stem, buds, and fruiting calyx, due to the presence of a thin film of minute, rapidly disappearing pubescence. The situation existing in *Litsea parvifolia* and *L. pedicellata* parallels that in *L. Pringlei* and *L. novoleontis*. The ♂ inflorescence of *L. parvifolia* is a single axillary subterminal umbel borne on slender more or less recurving peduncles. The flowers, 3 or 4 per umbel, are subtended by densely tomentose pedicels 2 mm. long. The ♂ inflorescences of *L. pedicellata* are more densely aggregated near the tips of the flowering branchlets, occurring in a few subumbellate axillary clusters and a heavily flowered terminal panicle up to 3 cm. long. There is a slender grace perceived in the branchlet of *L. pedicellata* that is wholly lacking in the more coarse and rather stiff aspect of *L. parvifolia*. The leaf-blades of the type of the former are less heavily coriaceous and of a bluish green, with reticulations more prominent. In spite of these differences, there seems to be no sound reason for keeping up both species.

4. *Litsea glaucescens* H.B.K. Nov. Gen. & Sp. 2: 133 [168]. 1817.

Small aromatic tree, the branchlets smooth, dark or reddish brown or olive, terete. Petioles slender, canaliculate, 5–20 mm. long, ± 1 mm. in

diameter; leaf-blades variable, usually thinly coriaceous, sometimes membranaceous, olive-green to dark brown above when dried, glaucous to glaucescent or at least paler beneath, usually elliptic-lanceolate or lanceolate, occasionally oblong or ovate-lanceolate, (4-) 7-9 (-12.5) cm. long and (1-) 2-3 (-3.5) cm. broad, attenuate to cuneate or obtuse at base, acute to acuminate or sometimes obtusish at apex, usually with a mucro of varying length, glabrous throughout or sometimes in young stages slightly pubescent above and more densely pubescent beneath, the venation yellowish or red-brown and except for the costa obscure above, the lateral veins usually ascending, slightly prominent beneath, occasionally with the marginal vein prominent, the entire surface frequently conspicuously areolate. ♂ inflorescences axillary, solitary or racemose umbels less than 2.5 cm. long, the peduncles 1 cm. or less in length, usually glabrous, the pedicels up to .5 cm. long and pubescent. Flowers 3-5 per umbel, often slightly pubescent, up to 4 mm. long; perianth-lobes 6, membranaceous, oblong or elliptic, usually 3 mm. long, the tube very short, the stamens 9. ♀ inflorescences axillary, solitary umbels up to 2 mm. long, the peduncles up to 1.5 cm. long; flowers 3-5 per umbel, 2-3 mm. long, often slightly pubescent, the perianth-lobes 6, membranaceous, usually elliptic, the tube very short, the staminodia usually 9. Fruit a globular berry up to 12 mm. in diameter, subtended by the enlarged usually glabrous tube and pedicel up to 7 mm. long, flaring at the tip to 2 mm. in breadth usually, sometimes the tube expanding to form a shallow cupule or disc up to 4 mm. in diameter.

DISTRIBUTION: Northwestern Mexico, south and east to Guatemala, Honduras, and Costa Rica. The species occurs in every state of Mexico except Sonora and Durango in the northwest, and Coahuila and Nuevo Leon in the north central area, in which latter states it is replaced by the ovate-orbicular-leaved species. Type-material of the species was collected by Humboldt & Bonpland along the shores near Acapulco and in the mountains about Jalapa at 1280 m. altitude. The species in the broad sense occurs generally at an altitude of between 2000 and 3000 m. in forested mountainous regions, although to the north, where it abounds in the plains and along the coast, it descends to a much lower altitude. It is locally used for seasoning or flavoring for meats, soups, and other foods, and as a substitute for tea; it is used also as a medicine for colic pains, etc.

This widespread species, as *Tetranthera glaucescens*, was split into four varieties by Meissner (1864), the separation being made principally on the type of inflorescence. Hemsley (1882) listed also a second species *Litsea Neesiana* with two varieties. Mez (1889) submerged *L. glaucescens* var. *subsolitaria* (Meissner) Hemsley into the species proper, and elevated var. *major* Meissner to specific rank as *L. guatemalensis*. Bartlett (1909) set apart the Costa Rican collections as *L. flavescens*, and those from San Luis Potosí and Tamaulipas (*L. glaucescens* var. *subsolitaria*) as *L. Schaffneri*, in which he included *Parry & Palmer 798*, cited by Hemsley under *L. glaucescens* var. *subcorymbosa*.

It seems impossible at present to formulate any clear-cut species in this highly variable group. Careful study of the available material shows a single complex species which varies with each type of locality in which it has been collected. The typical variety, var. *subsolitaria* (the oldest varietal name extant applied to the type-material), was originally collected in Guerrero and Vera Cruz. Subsequent scattered collections have been

recorded from nearly every state in Mexico, each showing slight variation from the variety. On the periphery of the range of the typical variety are two divergent groups of specimens which seem worthy of varietal rank. They may be easily recognized in most cases, but frequently specimens are found which show a gradation toward the typical variety. A treatment of the three varieties follows.

- 4a. *Litsea glaucescens* var. *subsolitaria* (Meissner) Hemsley, Biol. Centr. Am. Bot. 3: 76. 1882; Mez in Jahrb. Bot. Gart. Berlin 5: 477. 1889; Bartlett in Proc. Amer. Acad. 44: 599. 1909.
Litsea glaucescens H.B.K. Nov. Gen. & Sp. 2: 133 [168]. 1817; Mez in Jahrb. Bot. Gart. Berlin 5: 477. 1889; Bartlett in Proc. Amer. Acad. 44: 599. 1909.
Litsea Cervantesii H.B.K., op. cit. 134 [168].
Tetranthera glaucescens Sprengel, Syst. Veg. 2: 267. 1825.
Persea ? *Orizabae* Martens & Galeotti in Bull. Acad. Sci. Brux. 10²: 358. 1843; Meissner in DC. Prodr. 15¹: 56. 1864; Hemsley, Biol. Centr. Am. Bot. 3: 72. 1882.
Tetranthera villosa Martens & Galeotti in Bull. Acad. Sci. Brux. 10²: 359. 1843.
Tetranthera Neesiana Schauer in Linnaea 19: 712. 1847; Meissner in DC. Prodr. 15¹: 193. 1864.
Tetranthera glaucescens var. α *subsolitaria* Meissner in DC. Prodr. 15¹: 193. 1864, p.p.
Tetranthera glaucescens var. β *subcorymbosa* Meissner, l. c.
Tetranthera glaucescens var. γ *racemosa* Meissner, l. c.
Tetranthera glaucescens var. δ *major* Meissner, l. c.
Tetranthera Neesiana var. β *corymbifera* Meissner, l. c.
Tetranthera Neesiana var. γ *villosa* Meissner, l. c.
Litsea glaucescens var. β *subcorymbosa* Hemsley, Biol. Centr. Am. Bot. 3: 76. 1882.
Litsea glaucescens var. γ *racemosa* Hemsley, l. c.
Litsea Neesiana Hemsley, l. c.; Mez in Jahrb. Bot. Gart. Berlin 5: 477. 1889; Bartlett in Proc. Amer. Acad. 44: 599. 1909; Standley in Contr. U. S. Nat. Herb. 23: 287. 1922.
Litsea Neesiana var. β *corymbifera* Hemsley, l. c.
Litsea Neesiana var. γ *villosa* Hemsley, l. c.
Litsea Orizabae Mez in Jahrb. Bot. Gart. Berlin 5: 479. 1889; Bartlett in Proc. Amer. Acad. 44: 599. 1909; Contr. U. S. Nat. Herb. 23: 287. 1922.
Litsea guatemalensis Mez in Jahrb. Bot. Gart. Berlin 5: 479. 1889; Bartlett in Proc. Amer. Acad. 44: 599. 1909.
Malapoenna glaucescens Kuntze, Rev. Gen. 2: 571. 1891.
Malapoenna guatemalensis Kuntze, l. c.
Malapoenna Neesiana Kuntze, l. c.
Malapoenna Orizabae Kuntze, l. c.
Litsea acuminatissima Lundell in Contr. Univ. Mich. Herb. 4: 3. 1940.
Litsea Matudai Lundell, op. cit. 5.

MEXICO: Without locality, *Humboldt & Bonpland s.n.* (δ fl., type of *Litsea Cervantesii* not seen), *Aschenborn 349* (fl., type of *Tetranthera Neesiana* not seen), *Haenke [1539]* (φ fl., NY). Chihuahua: Sierra Canelo, Río Mayo, *Gentry 2539* (fr., A). Sinaloa: Culiacán, August 27–Sept. 15, 1891, *E. Palmer 2770* (sterile, GH, US), ?*Montez & Salazar 1688* (sterile, US); Cerro del Viejo, San Ignacio, *Montez & Salazar 82* (δ fl., US). Zacatecas: Plateado, *Rose 3650* (φ fl., US). Nayarit (Tepic): In the Sierra Madre, near Santa Teresa, *Rose 3437* (sterile, US). Jalisco: Bolaños, *Rose 3746* (fr., US). Hidalgo: El Chico, *Lyonnet 727* (fr., A, NY, US); Real del Monte, March 22, 1849, *Gregg 639* (δ fl., ISOSYNTYPE of *Tetranthera glaucescens* α *subsolitaria*, GH) (shrub; [fl.] yellowish); on Sierra de Pachuca, *Rose & Hay 5566* (fr., US). Vera Cruz: La Joya, Perote, *Balls 5520* (φ fl., fr., A); near Jalapa, *Pringle 8156* (δ fl., GH, NY, US), *Schiede & Deppe s.n.* (δ fl., GH, NY); on eastern slopes of mountains near Jalapa, 1280 m. alt., *Humboldt & Bonpland s.n.* (φ fl.,

SYNTYPE of *Litsea glaucescens* not seen); Mirador, *Liebmann* (*Lauraceae* 60) (♂ fl., US), August 1841, *Liebmann s.n.* (♂ fl., US), *Mohr s.n.* (♂ fl., US); San Cristóbal, Orisada [Orizaba], *Mohr* [434] (♂ fl., US); Orizaba, *Balls* 4320 (♂ fl., A), *Bilimik* 359 (♂ fl., GH, US), *Botteri* 7 (♂ fl., GH, US), 108, 183 (fr., GH, US), 549 (♂ fl., GH), *Bourgeau* 3128 (fr., GH), *Galeotti* 252 (fl., type of *Persea* ? *Orizabae* not seen), *Liebmann* (*Lauraceae* 65) (♂ fl., cited by Mez under *Litsea Orizabae*, fragm., US), *Matuda* 591 (sterile, A), *F. Mueller* 308, 1307 (♂ fl., NY); Maltrata, May 6, 1937, *Matuda* 1211 (fr., A, type of *Litsea acuminatissima*-Mich); various localities, *Schiede* 58 (fr., NY). Puebla: Chinautla, alt. 2100-2400 m., May 1841, *Liebmann s.n.* (sterile, GH, US). Mexico: Temascaltepec, Pineda, *Hinton* 3188 (♀ fl., NY, US); Las Cruces, *Hinton* 3257 (♂ fl., A, US), 7223 (♀ fl., GH), Salitre-Canitas, *Hinton* 3940 (fr., A). Michoacán: Sierra Torricillas, Coalcomán, *Hinton* 12365 (♂, GH), 12800 (♂, GH), 15746 (♂, US). Guerrero: On shores near Acapulco, *Humboldt & Bonpland s.n.* (♀ fl., SYNTYPE of *Litsea glaucescens* not seen); Piedra Ancha-Tres Cruces, Galeana, *Hinton* 15418 (♀ fl., GH). Oaxaca: Without locality, *Cuming* (♂ fl., isotype of *Tetranthera glaucescens* γ *racemosa*, NY); Talea, alt. 900 m., Feb. 184-, *Galeotti* 257 (♂ fl., GH [as 2977], US) (fl. white-rose), alt. 1800 m., Oct. 184-, *Galeotti* 258 (♀ fl., US) (fl. white); Villa Alta, *Schultes* 637 (sterile, NY); Sierra de San Felipe, in forests and on small wooded plateaus in the mountains, alt. 2700-2900 m., on lime-ridges of Sola, alt. 2400-2600 m., and in the vicinity of Yavesia and Capulapán, alt. 2100-2600 m., *Galeotti* 251 (fl., type of *Tetranthera villosa* not seen); Sierra de San Felipe, *Pringle* 5679 (♂ fl., GH), *Conzatti & Gonzales* 1120 (♀ fl., GH, US); mountains southeast of Miahuatlán, alt. 3050 m., *Nelson* 2531 (♀ fl., GH, US); Cafetal San Rafael (Cerro Espino), *Reko* 3562 (♂ fl., US). Chiapas: Between Huitztán and Oxchuc, *C. & E. Seler* 2149 (♂ fl., GH, NY, US); Saxchanal, Sierra Madre, *Matuda* 4284 (♂ fl., A, NY, US); Comitán, *Goldman* 818 (♂ fl., US); between San Cristóbal, Las Casas, and Huitztán, *C. & E. Seler* 2137 (♂ fl., GH); west side of Volcán de Tacaná, alt. 2800 m., March 30, 1939, *Matuda* 2933 (♀ fl., fr., isotype of *Litsea Matudai*, A, GH, NY). GUATEMALA: Petén: San Pedro L[ake], *Texada* 54 (♂ fl., US). Quiché: San Miguel Uspantán, *Heyde & Lux* 3466 (♀ fl., US). Baja Verapaz: Montaña de San Ysidro-San Jerónimo, *Salas* 491 (fr., US); dry, rocky hills n. of Santa Rosa, *Standley* 69694 (sterile, NY). Huehuetenango: Sierra de los Cuchumatanes, above Chiantla, *Standley* 65630 (♀, NY). San Marcos: Above Río Tacaná, near San Antonio, *Standley* 66089 (sterile, A). Quezaltenango: Cerro Quemado, *Kellerman* 5927 (♂ fl., US), 5935 (♂ fl., US); Cerro La Pedrera, south of Quezaltenango, *Standley* 66450 (♂ fl., A, NY); slopes of Volcán de Santa María, above Palojunoy, *Standley* 67526 (♀ fl., A). Guatemala: Volcán de Pacaya, above Las Calderas, *Standley* 58448 (♀ fl., A). Sacatepéquez: Near San Juan, *Hartweg* 613 (♂ fl., isotype of *Tetranthera glaucescens* δ *major*, US); San Rafael, *J. D. Smith* 1276 (♂ fl., GH, US); slopes of Volcán de Agua, south of Santa María de Jesús, *Standley* 59447 (♂ fl., A, NY), Volcán de Agua, *Kellerman* 4953 (♂, US), *Maxon & Hay* 3753 (♂, US); Santa María de la Antigua, *Pittier* 13 (♂, US); hills of Finca Carmona, s.e. of Antigua, *Standley* 63668 (sterile, US). Chimaltenango: Cerro de Tecpám, region of Santa Elena, *Standley* 58756 (♂, NY, US); Barranco de la Sierra, s. e. of Patzún, *Standley* 61605 (♂, A, NY); Chichavac, *Skutch* 253 (♂, US), *Salas* 581 (♂, US). EL SALVADOR: Chalatenango: La Reina, *S. Calderón* 2456 (♂, NY, US). San Salvador: Cultivated in Santa Tecla, *S. Calderón* 1489 (♀, GH, NY, US). HONDURAS: Comayagua: Near El Achote, hills above plains of Siguatepeque, *Yuncker, Dawson & Youse* 6370 (♂, GH).

NATIVE NAMES: "Laurel" (Vera Cruz, Mexico, Michoacán, Guerrero, Oaxaca, Chiapas, Baja Verapaz, Chimaltenango, Quezaltenango); "Laurill" (Zacatecas, Nayarit [Tepic], Jalisco); "Laurillo" (Michoacán); "Laurel de la Sierra" (Sinaloa); "Ziz-uch" (Chiapas); "Laurel aromático" (Petén); "Laurel de especie" (El Salvador).

The specimen from Chihuahua occurs in the transition pine-oak country and, at first glance, seems to be at variance with the typical variety as we

are most familiar with it. The leaf-blades are densely pubescent beneath, slightly smaller, acutish rather than acuminate, and oblongish lanceolate rather than elliptic. Otherwise, the number is similar to the other specimens found in the northern Mexican states.

The collections made in Sinaloa, Zacatecas, Nayarit, Jalisco, and Mexico are similar to those found in Hidalgo, and show a tendency toward specimens of the varietal segregate *Schaffneri* as found in Tamaulipas.

In Vera Cruz we find the typical variety in its truest sense. The lanceolate-elliptic acuminate leaf-blades measure $9.5 \times 2.5-3$ cm. and are abundant on the branchlets, bearing in their axils numerous short-pedunculate inflorescences, simple or branched. The original description of *Persea Orizabae*, from this region, is sketchy. Mez enlarges this to indicate a tree with large leaf-blades, comparatively speaking (7.5–3.5 cm.), ovate to lanceolate, albescent or softly cinereous-long-tomentose beneath. Except for the pubescence, which has been found to be extremely variable in this group, the fragment matches perfectly any number of specimens of typical *L. glaucescens* from Vera Cruz and Oaxaca.

The sterile Liebmann sheet from Puebla, not far from Orizaba, Vera Cruz, shows leaf-blades that are certainly broader than is usual with *L. glaucescens*. There can be no doubt that the sheet is lauraceous and probably a variant of this species. After one hundred years in an herbarium, the bark still has the characteristically pungent odor typical of many Lauraceae.

The specimens collected by Hinton in Michoacán have leaf-blades that are slightly broader in proportion to their length, and the veins are rather more arcuate than is the case of the majority of leaf-blades found on typical specimens. It is unfortunate that material from one of the type-localities of the typical variety is so scanty. The Hinton plant is not typical, for it possesses the largest-known leaf-blades of the genus in America (13×3.5 cm.). There is no doubt, however, that in spite of their oversize, the sheet belongs here. The Oaxacan material was collected very near the type-locality of the species and is similar to specimens found there. The material from Chiapas also ties up with that from Oaxaca and Vera Cruz. The elliptic or lanceolate-elliptic leaf-blades of the specimens are very conspicuously reticulate and shining. The branchlets are densely leafy and the inflorescences are very full-flowered.

The Guatemalan specimens differ from typical *L. glaucescens* in consistently having on the lower surface of the leaves a pubescence of varying density, sometimes early exhibiting a thick tomentum which later may be reduced to a few strigose hairs persisting about the costa and veins. The young branchlets also are pubescent in varying degrees, as are the petioles, peduncles, and pedicels. The leaves tend for the most part to be more elliptic than lanceolate. Again these specimens must be included in the species in the broad sense and not maintained as a separate species.

Schauer's description of the leaf-blades of *T. Neesiana* mentions the shining upper surface scattered with stellulate-pilose dots, a characteristic not

found in the Lauraceae. The remainder of the description is typical of the genus, so probably the type of pubescence was erroneously reported.

4b. *Litsea glaucescens* var. *Schaffneri* (Bartlett), comb. nov.

Tetranthera glaucescens var. *α subsolitaria* Meissner in DC. Prodr. 15¹: 193. 1864, p.p.

Litsea Schaffneri Bartlett in Proc. Amer. Acad. 44: 600. 1909; Standley in Contr. U. S. Nat. Herb. 23: 288. 1922.

Litsea pallens Lundell in Contr. Univ. Mich. Herb. 4: 5. 1940.

DISTRIBUTION: Mountains of San Luis Potosí, Guanajuato, and Tamaulipas.

MEXICO: Tamaulipas: Cerro los Armadillos, vicinity of San José, *Bartlett* 10389 (fr., GH, US); in shady gorges before arriving at Palmilla from Victoria to Tula, Nov. 1830, *Berlandier* 2185 (=765) (isosytype of *Tetranthera glaucescens* var. *α subsolitaria*, GH, NY); vicinity of Victoria, alt. 320 m., Feb. 1–April 9, 1907, *E. Palmer* 208 (fr., GH, US), *Runyon* 1008 (♀ fl., US); San Leucas, *Viereck* 44, 585 (♂ fl., fr., US); Sierra near Victoria, alt. 1200 m., Feb. 1932, *von Rozynski* 341 (♂ fl., isotype of *L. pallens*, NY, US). San Luis Potosí: Near Santa Barbara, *Hartweg* 382 (♂ fl., US); near San Luis Potosí, Sept. 12–16, 1902, *E. Palmer* 453 (♀ fl., A, US), May 24, 1905, *E. Palmer* 647 (fr., GH, US), *Parry & Palmer* 798 (♀ fl., fr., GH, NY, US); in mountains, San Miguelito, Sept. 1876, *Schaffner* 23 (♂ fl., TYPE of *L. Schaffneri*, GH), 431, 463 (♂ fl., NY, US), 710 (♀ fl., ♂ fl., fr., GH). Guanajuato: Santa Rosa, *Dugès* 231 (♂ fl., US), 1000 (♂ fl., GH).

NATIVE NAMES: "Laurel," "Sacred Laurel" (San Luis Potosí).

This aggregate is one of the extreme variants from the norm of *Litsea glaucescens*. The shrub bears slender foliose ochraceous branchlets, with narrowly lanceolate mucronulate leaves, acute at both ends, more or less coriaceous, glabrous and glaucous beneath, the venation inconspicuous except for the prominent midrib and reticulation. The leaf-blades vary in size, being 2–6 cm. × 5–12 mm. The inflorescences are usually solitary pedunculate umbels located in the axils of the leaves of terminal or lateral branchlets. The rather large globose and black fruits are about 12 mm. in diameter.

The specimens from Tamaulipas differ from those from the type-locality in their larger more acuminate leaf-blades, not glaucous but concolorous, with more prominent venation. Lundell notes the similarity between *L. pallens* and *L. Schaffneri*.

4c. *Litsea glaucescens* var. *flavescens* (Bartlett), comb. nov.

Litsea flavescens Bartlett in Proc. Amer. Acad. 44: 599. 1909; Standley in Field Mus. Publ. Bot. 18: 451. 1937.

DISTRIBUTION: Mountainous regions of Costa Rica, at an altitude of 1500–1900 m.

COSTA RICA: San José: Hills above Belmira, near Santa María de Dota, alt. 1600 m., Jan. 1898, *Tonduz* 7352 (Herb. Nat. Costa Rica 11638) (♂, ♀ fl., TYPE of *L. flavescens* — GH, NY, US), *Standley* 42525 (♂ fl., US); Cuesta de Tarrazú, *Tonduz* 7796 (♂ fl., US); in mountains of Candelaria, *Oersted* 10 (♂ fl., US).

NATIVE NAME: "Lentisco."

This Costa Rican segregate is distinguished by the striking flavescent venation, particularly the prominent marginal vein, and the yellowish petiole apparent in the dried specimens, as well as the lack of glaucosity on the lower leaf-surface. Bartlett also mentions the smaller flowers and the tomentose pedicels as presenting specific differences. Both of these characters seem of too variable a nature to be criteria of specific importance.

Pubescence may be found on many specimens of the typical variety; and some of the Chiapas material shows a similarity of foliage-characters. Since no specimens have been collected as yet in the intervening areas, the entity is maintained for the present as a regional variety of *L. glaucescens*.

6. *Beilschmiedia* Nees

Beilschmiedia Nees in Wallich, Pl. As. Rar. 2: 61, 69. 1831, Syst. Laurin. 21, 192, 197. 1836; Meissner in DC. Prodr. 15¹: 62. 1864; Kostermans in Rec. Trav. Bot. Néerl. 35: 847. 1938 (Meded. Bot. Mus. Utrecht 48: 847. 1938).

Hufelandia Nees, Pl. Laurin. Expos. 11 (n.9), 21. 1833, Syst. Laurin. 187, 674. 1836; Meissner in DC. Prodr. 15¹: 65. 1864.

DISTRIBUTION: Tropical regions of both hemispheres.

KEY TO THE SPECIES OF BEILSCHMIEDIA

- A. Leaf-blades on both surfaces prominently and loosely and often incompletely reticulate.
 - B. Leaf-blades elliptic, not less than 7 cm. in width, glaucous beneath; fruits to 15 cm. in length.....1. *B. Anay*.
 - B. Leaf-blades elliptic or lanceolate-elliptic, not exceeding 4-5 cm. in width, not glaucous beneath; fruits not more than 4 cm. long.
 - C. Branchlets and leaf-blades glabrous; leaf-blades long-acuminate, shining; venation loosely reticulate.
 - D. Branchlets gray, becoming red-brown or maculate, not corky; leaf-blades chartaceous, sharply caudate-acuminate, not pronouncedly undulate; fruit not constricted at base, not more than 3 cm. long.....2. *B. hondurensis*.
 - D. Branchlets gray, corky; leaf-blades coriaceous, obtusely acuminate, prominently undulate; fruit slightly constricted at base, up to 4 cm. long.....3. *B. Brenesii*.
 - C. Branchlets and leaf-blades yellowish brown-pubescent; leaves acutish to obtuse; venation incompletely reticulate.....4. *B. costaricensis*.
- A. Leaf-blades on both surfaces prominently and completely reticulate, or the upper surface plane and the lower areolate.
 - B. Leaf-blades concolorous, at least not glaucous beneath, glabrous; inflorescence few-flowered, subglabrous.
 - C. Upper surface of leaf-blades completely and conspicuously reticulate.....5. *B. mexicana*.
 - C. Upper surface of leaf-blades plane6. *B. Steyermarkii*.
 - B. Leaf-blades glaucous beneath, glabrescent at maturity; inflorescence densely flowered, tomentose-pilosulose.
 - C. Branchlets cinereous-puberulous; leaf-blades above sparsely and beneath more densely pilosulose with loose whitish hairs.....7. *B. ovalis*.
 - C. Branchlets ferruginous-tomentose; leaf-blades glabrous above, except for lower portion of midrib, and beneath pubescent along veins.....8. *B. Austin-Smithii*.

1. *Beilschmiedia Anay* (Blake) Kostermans in Rec. Trav. Bot. Néerl. 35: 847. 1938 (Meded. Bot. Mus. Utrecht 48: 847. 1938).

Hufelandia Anay Blake in Jour. Wash. Acad. Sci. 9: 459, fig. 1. 1919.

DISTRIBUTION: From the forests of Central America, at an altitude of less than 300 m., to Colombia (according to Kostermans), at increasingly higher altitudes (2000 m.).

GUATEMALA: Alta Verapaz: Finca Chamá, *Popenoe* 884 (fr., US), *H. Johnson* 170 (fl., Ch, US). Suchitepéquez: In loamy soil of tropical forest at Finca Compromiso, Mazatenango, alt. about 365 m., Jan. 17, 1917, *Popenoe* 754 (fl., fr., TYPE of *Hufelandia Anay*, US). Escuintla: Río Guacalate, *Standley* 60223 (fl., Ch).

NATIVE NAMES: "Anay" (Guatemala); "Laurel canime" (Colombia, fide Kostermans).

This tree bears fruit of good flavor, similar to that of an avocado, but not oily, according to the collector.

2. *Beilschmiedia hondurensis* Kostermans in Rec. Trav. Bot. Néerl. 35: 854. 1938 (Meded. Bot. Mus. Utrecht 48: 854. 1938).

DISTRIBUTION: At high altitudes in the interior of British Honduras.

BRITISH HONDURAS: Toledo: Temash River, *Kinloch 9a* (Y 35111) (sterile, Y); Camp 31, British Honduras-Guatemala Survey, alt. 630 m., April 7, 1934, *Schipp 1262* (fr., ISOTYPE, Ch, GH, NY) (small tree-like shrub, quite common in the interior at high altitudes; 7.5 m. high, 7.5 cm. diam.; fruit black).

This shrub, quite common according to the original collector, is represented at present only by a sterile specimen and the type, which is a fruiting branch from which most of the leaves and fruits have fallen on drying. The chartaceous, lanceolate to elliptic, long-acuminate leaf-blades, acutish at the base and prominently reticulate on both surfaces, measure up to 13.5 cm. in length and 4 cm. in width. The round canaliculate petiole is 5 (-9) mm. long. The short infructescences, up to 4 (-7.5) cm. long, bear somewhat enlarged peduncles about 5-6 mm. long and nearly 3 mm. thick, are a lightish rust-brown, rugulose in contrast to the smooth deeper red-brown young branchlets and the pale gray branches. The green or black (according to Schipp) smooth ellipsoid fruit attains a length of 3 cm. and a width of 1.5 cm.

3. *Beilschmiedia Brenesii*, sp. nov.

Arbor, ramulis griseis suberosis lucidis mox opacis, apicibus fusco-brunneis. Folia opposita (?), petiolis glabris verruculosus brunneis canaliculatis, 3-10 mm. longis, laminis glabris coriaceis supra lucidis, ellipticis, ad 8 cm. longis et 3.5 cm. latis, basi cuneatis, apice obtuse plus minusve abrupte acuminatis, margine recurvatis et laxe undulatis, penninerviis, costa supra tenuiter subtus crasse elevata, nervis 8-paribus supra et subtus delicate leviterque elevatis, rete venularum laxo supra conspicue subtus conspicuissime prominulo. Inflorescentia ignota. Infructescentia robusta, brevis, ad 7 cm. longa, pedunculis crassis et lignosis ramulis similibus aequalibusque, fructibus duobus tantum maturantibus. Fructus in sicco niger, lucidus, glaber, ellipsoideus, ad 4 × 2 cm., apice rotundatus, basi leviter constrictus, pedicello incrassato glabro, ad 10 mm. longo et 4 mm. lato.

DISTRIBUTION: Known only from the type-locality.

COSTA RICA: Alajuela: La Palma and El Socorro de San Ramón, July 24, 1928, *Brenes 6214* (fr., TYPE, Ch).

The new species is like none other from this hemisphere, but resembles very strikingly species of the genus found in eastern Asia. The nearest relative here is *B. hondurensis*, easily separated by the less rigidly coriaceous leaf-blades usually with sharply caudate-acuminate tips, the branchlets showing no corky tendency, and the much smaller fruit.

4. *Beilschmiedia costaricensis* (Mez & Pittier), comb. nov.

Hufelandia costaricensis Mez & Pittier ex Mez in Bull. Herb. Boiss. II, 3: 228. 1903 (excl. *Pittier 1863, 1873*, fide Kosterm.); Standley in Contr. U. S. Nat. Herb. 23: 292. 1922, in Field Mus. Publ. Bot. 18: 451. 1937.

DISTRIBUTION: Forests of Costa Rica, at an altitude of about 1800 m.

COSTA RICA: Alajuela: San Francisco and San Pedro de San Ramón, *Brenes 6605* (fl., Ch); La Peña de Zarcero, *A. Smith H. 592* (fl., Ch). San José: near Quebradillas, about 7 km. north of Santa María de Dota, *Standley 42865* (sterile, US); vicinity of El General, *Skutch 4389* (fr., A, Ch); San Isidro del General, *Stork 3121* (fr., Ch); forests of El Copey, alt. 1800 m., Feb. 1898, *Tonduz 11713* (fl., ISOSYNTYPE of *H. costaricensis*, US). Cartago: Hills near Navarro Valley, *Stork 1713* (fl., fr., Ch).

NATIVE NAME: "Quizarrá" (Costa Rica).

Kostermans separates the syntypes of *Hufelandia costaricensis* and places *Pittier 1863* under *B. Anay*. He associates *Tonduz 11713* with *B. mexicana*. From the material at hand it appears that the latter syntype of *H. costaricensis* differs from the sheets of *B. mexicana* in its larger leaf-blades, which are less variable in size, and present a more coarse and very prominent reticulation. The usual type of reticulation found in the family is a dense net-work of veinlets with seemingly no free "terminals" visible beneath the microscope in the dried state. The leaves of *B. costaricensis* show the veinlets with prominent free ends or terminals apparently forming an incomplete reticulum, whereas those of *B. mexicana* follow the usual pattern of complete reticulation. The inflorescences of the former are longer, rather more densely flowered, and somewhat pubescent as opposed to the few-flowered, glabrous inflorescences of *B. mexicana*. The flowers of *B. costaricensis* are slightly larger and possess longer tubes; they are pilose and bear staminodia that are long-acuminate. The flowers of *B. mexicana* are almost glabrous, with acute or abruptly acuminate staminodia. The fruit of *Beilschmiedia costaricensis* is ellipsoid, whereas that of *B. mexicana* is constricted at the base, a character which may eventually prove to be a variation due to age.

I have not seen *Pittier 1863*, a syntype of *H. costaricensis*, the number about which Kostermans is uncertain, although he places it under *B. Anay*. From the original description by Mez and Pittier, one may note differences between their species and *B. Anay*. For example, the leaf-blades of *H. costaricensis* are glabrous, concolorous, and in the dried state customarily fuscous-brown, whereas those of *B. Anay* are glabrous except for a sordid puberulence along costa and lateral veins, and are green above and glaucous beneath. The flowers of *B. Anay* are larger than those of *Hufelandia costaricensis* and the staminodia are triangular-acuminate and short-stipitate as opposed to the cordate, very long-acuminate staminodia of the latter. The ovary of *H. costaricensis* is ovoid, developing into a perfectly ellipsoid fruit, scarcely constricted toward the base and attaining a size of 3 cm. \times 1.2 cm. The subglobose ovary of *B. Anay* becomes an ellipsoid, pyriform, glossy-skinned fruit about 15 cm. long and similar in aspect to the avocado pear (*Persea americana*). The differences in leaf and flower may very possibly be variations within the species. The discrepancy in size and shape of fruit may be due to the stage of development at which the specimen was collected. Presumably, Kostermans was of this opinion when he combined the two under *B. Anay*.

5. *Beilschmiedia mexicana* (Mez) Kostermans in Rec. Trav. Bot. Néerl. 35: 846. 1938 (Meded. Bot. Mus. Utrecht 48: 846. 1938).

Hufelandia mexicana Mez in Jahrb. Bot. Gart. Berlin 5: 20. 1889.

DISTRIBUTION: Mexico, and south to Colombia according to Kostermans.

MEXICO: Vera Cruz: Cosalapa, *Purpus* 8745 (fl., US); Mirador, *Liebmann* 711 (*Lauraceae* 16), Totula, *Liebmann* 713 (*Lauraceae* 18) (fr., ISOSYNTYPES, US); Orizaba, *F. Mueller* 1460 (fr., SYNTYPE of *H. mexicana* not seen). Mexico: Dos Puentes, *Liebmann* 712 (*Lauraceae* 20) (sterile, ISOSYNTYPE, US), *Liebmann* (*Lauraceae* 17, 19, 21) (SYNTYPES not seen).

This rather small-leaved tree, according to Kostermans, occurs in Mexico, Costa Rica, and Colombia. He places *H. costaricensis*, as exemplified by *Tonduz* 11713, in this species. I have not seen the syntype from Orizaba, nor have I seen any Costa Rican or Colombian specimens which are a match for the Mexican material cited by Mez in his original publication. In the main, the glabrous branchlets, the small, typically minutely reticulate leaf-blades of varying size, the glabrous inflorescences shorter than the leaves, and the ellipsoid fruit set this species apart. For a discussion of the relationship with *H. costaricensis*, which was reduced by Kostermans, see the latter species.

6. *Beilschmiedia Steyermarkii*, sp. nov.

Arbor 18–24 m. alta, ramulis brunneis, subferrugineo-pubescentibus mox glabrescentibus, leviter sulcatis. Folia alternata, supra glabra, subtus sparse pubescentia costis exceptis, petiolis brunneis paulo crassis glabrescentibus leviter canaliculatis, ad 1.5 cm. longis et 2 mm. latis, laminis coriaceis, in sicco supra flavo-brunnescentibus subtus olivaceis, fide coll., supra viridibus subtus caeruleo-griseo-viridibus, ellipticis, ad 10 cm. longis et 3.7 cm. latis, basi cuneatis vel obliquis, apice rotundatis, penninerviis, costa subtus conspicua haud elevata, nervis lateralibus ad 7-paribus supra impressis plus minusve obscuris, subtus leviter elevatis angulo 45° divergentibus, subtus minute et inconspicue areolatis. Inflorescentia axillaris et subterminalis, paniculata, ad 8 cm. longa, leviter et sparse ferrugineo-tomentosa, mox glabrescens(?), pauciflora, pedunculata. Flores ad 3 mm. longi, pedicellis ad 2 mm. longis gracilibus, pubescentibus, perianthio campanulato flavo-viridescente, lobis ovatis nonnihil crassis pubescentibus, ad ± 1.7 mm. longis; staminibus ser. I & II ± 1.5 mm. longis antheris ovatis truncatis quam filamentis duplo longioribus, connectivo papilloso $\frac{1}{3}$ auctis antherae longitudine, ser. III oblongis truncatis minute biglandulosis; staminodiis ± 1 mm. longis late ovatis abrupte acuminatis subcordatis stipitatis, stipite pubescente; gynaecio glabro ad ± 1.7 mm. longo, ovario ovoideo quam stylo longiore, stigmatibus inconspicuis parvis. Fructus ignotus.

DISTRIBUTION: Known only from type-locality.

GUATEMALA: Alta Verapaz: South of Cubilgüitz, alt. 300–400 m., March 4, 1942, *Steyermark* 44494 (fl., TYPE, Ch) (tree 18–24 m.; leaves deep green above, blue-gray-green beneath; calyx yellow-green).

This single Guatemalan specimen described above is characterized by glabrescent elliptic coriaceous leaf-blades that are yellow-brown on drying, and by few-flowered sparsely pubescent inflorescences up to 8 cm. long. The lack of reticulation on the upper leaf-surface sets the species apart from other members of the genus.

7. *Beilschmiedia ovalis* (Blake), comb. nov.

Hufelandia ovalis Blake in Jour. Wash. Acad. Sci. 9: 461. 1919; Standley in Field Mus. Publ. Bot. 18: 451. 1937.

DISTRIBUTION: Costa Rica, known only from the type-locality.

COSTA RICA: Alajuela: Volcán de Poás, alt. 2300 m., March, *Pittier 2040* (fr., TYPE of *H. ovalis* not seen).

Kostermans has reduced Blake's species to synonymy under *B. sulcata*. Kostermans did not see any flowers of the type of *Laurus sulcata* R. & P., but he found no difference between the sterile specimen and other Peruvian and Colombian material cited by him (Kostermans in Rec. Trav. Bot. Néerl. 35: 850. 1938 [Meded. Bot. Mus. Utrecht 48: 850. 1938]). He explains the drawing of the type in Ruiz & Pavon, *Laurographie*, t. 356, showing 4-celled anthers, by bringing forward the possibility of the presence of cells in the ablatic part of the connective. Kostermans' conclusions may very possibly be correct, but it is difficult to accept them without more widely collected material than is available at present.

8. *Beilschmiedia Austin-Smithii* (Standley), comb. nov.

Persea Austin-Smithii Standley in Field Mus. Publ. Bot. 18: 1552. 1938.

DISTRIBUTION: Known only from the type-locality.

COSTA RICA: Alajuela: Palmira, Alfaro Ruiz, in a little swale at the edge of the forest, in a sunny position with eastern exposure, growing on clay-loam, April 30, 1937, *A. Smith 4168* (fl., TYPE, Ch) (a rare but notable tree 9 m. high, with same expanse, the bark obscurely gray, thick and corky; base of trunk 2 m. in diam., the main trunk broken off, with 2 laterals 20 cm. in diam.; bud-cluster yellowish; open flowers dull yellow-brown; leaves moderately lustrous on the upper surface).

This species is unusual at once for its densely foliose branchlets with very short internodes and its rounded, ovate or suborbicular, very small leaf-blades, not more than 7 cm. long (almost the smallest to be found in the genus), the upper surface of which is not reticulate. The long-pedunculate, many-flowered, loosely sordidly tomentose panicles are shortly branched and equal the leaves. The flower-structure is typically that of *Beilschmiedia*, with the nine fertile anthers two-celled, and with a well developed connective, particularly on the anthers of the third series. The large subcordate staminodia and the characteristic gynaeceum mark the species as belonging to this genus. A sterile specimen in the Yale School of Forestry Herbarium bearing the collector's number 3, and the note that it was collected on Holstein Farm, Costa Rica, and sent presumably from the United Fruit Co., Sept. 9, 1938, may belong to this species.

7. *Aiouea* Aublet

Aiouea Aublet, Pl. Guian. 1: 310, 3: t. 120. 1775; Nees, Syst. Laurin. 362. 1836; Meissner in DC. Prodr. 15¹: 82. 1864; Mez in Jahrb. Bot. Gart. Berlin 5: 28. 1889; Kostermans in Meded. Bot. Mus. Utrecht 46: 37. 1938 (Rec. Trav. Bot. Néerl. 35: 37. 1938).

DISTRIBUTION: Mostly in South America, with one species in the West Indies and two in Central America.

KEYS TO THE SPECIES OF AIOUEA

- A. Largest leaf-blades usually not more than 12 (-13) cm. long and 6 cm. broad; apex obtuse or rounded (only very occasionally obtusely and shortly acuminate); reticulation very conspicuous beneath.....1. *A. costaricensis*.

A. Largest leaf-blades up to 16 (-18) cm. long and 7.5 cm. broad; apex obtusely and shortly acuminate; reticulation only slightly prominent beneath... 2. *A. Lundelliana*.

1. *Aiouea costaricensis* (Mez) Kostermans in Meded. Bot. Mus. Utrecht 46: 73. 1938 (Rec. Trav. Bot. Néerl. 35: 73. 1938).

Bellota costaricensis Mez in Jahrb. Bot. Gart. Berlin 5: 27, t.3, fig.24. 1889; Standley in Field Mus. Publ. Bot. 18: 450. 1937.

Boldus costaricensis Kuntze, Rev. Gen. 2: 569. 1891.

DISTRIBUTION: Costa Rica, in wet woods and along river-banks on volcano-slopes, at an altitude of 1600-2400 m.

COSTA RICA: Alajuela: San Pedro de San Ramón, *Brenes* 22563 (fl., fr., Ch); La Brisa de Zarcero, Alfaro Ruiz, *A. Smith P.C.* 268 (fl., Ch), *H.* 442 (fl., Ch); Zarcero, *A. Smith P.* 2316 (fl., A); Palmira, Alfaro Ruiz, *A. Smith H.* 681 (fl., Ch), 4169 (fl., Ch); La Ventolera, on the southern slope of Volcán de Poás, *Standley* 34579 (fr., US). Heredia: Cerro de las Caricias, north of San Isidro, *Standley & Valerio* 52072 (fl., US); bank of Río Segundo, mountains of Volcán de Barba, *Tonduz* 1794 (fr., US). San José: Highest Carpintera, *Stork* 1399 (fr., Ch); Santa Maria, *Stork* 1735 (fr., Ch); Candelaria, *Hoffman* 857 (fl., TYPE of *Bellota costaricensis* not seen, photo. at GH); El Tablazo de San José, *Valerio* 33 (fl., Ch). Cartago: Near Camp Empalme, *Little* 6023 (fr., A, Y).

NATIVE NAMES: "Ira," "Ira colorado," "Ira rosa" (Costa Rica).

At the present time this is the second representative of the genus to be found in Central America or Mexico. It reaches a height of 12-18 m., with a base up to 40 cm. in diameter. Typically, the specimens show the yellowish green color of the alternate leaves noticeable even in the dried state, and the loose, coarse, conspicuous reticulation more prominent on the lower than on the upper surface. The dark brown, minutely appressed-pubescent branchlets become glabrous, gray-rugose with age. The coriaceous leaf-blades, early pubescent and glabrous at maturity, are obovate-elliptic to spatulate, with the apex rounded to obtuse or obtusely acute, occasionally emarginate, and the base acutish, decurrent into a thick minutely appressed-pubescent rugulose petiole up to 1 cm. in length. The margin is recurved and the midrib is thick, broadened at the base and exceedingly prominent beneath. The glabrous inflorescence is a loose panicle, 5-15 cm. long, bearing numerous pale yellow glabrous obconical flowers. The broad fleshy perianth-lobes are as long as or slightly exceed the tube. The three outer rows of stamens are fertile; those of the third and inner row are larger, extrorse, and biglandular. The fourth row, according to Kostermans, consists of three thin, sagittate, stipitate staminodia, inserted below the stamens as is typical of the genus. I have seen no staminodia in the flowering specimens which I have examined. The fruit is ellipsoid, up to 15 mm. long and ± 8 mm. in diam., green, subtended by a red fleshy cupule approximately 1 cm. deep and broad, topped by six distinct teeth, the remnants of the perianth-lobes which have enlarged with the tube.

2. *Aiouea Lundelliana*, sp. nov.

Arbor 12-30 m. alta, ramulis brunneo-griseis rugosulis verruculosis. Folia alternata, verticillata, juventute ferrugineo-sericeo-pubescentia mox glabra, petiolis alatis crassis glabris canaliculatis, ad 2 cm. longis et 4 mm. latis, laminis supra glabris, subtus leviter et obscure pubescentibus, coriaceis, in sicco utrinque brunneis, obovato-ellipticis, ad 16 (-18) cm. longis et 7.5 cm. latis, basi attenuato-cuneatis, in petiolum decurrentibus ibique valde recurvatis, apice rotundatis vel late acutis vel abrupte late et obtuse acuminatis, interdum emarginatis, margine recurvatis, penninerviis, costa

supra haud subtus conspicue et crasse elevata, nervis 7- vel 8-paribus supra obscure impressis subtus elevatis angulo 45° divergentibus, rete venularum supra obscurissimo subtus prominulo. Inflorescentia axillaris, late paniculata, ad 20 cm. longa, glabrescens, multiflora, longipedunculata. Flores ad 3 mm. longi, pedicellati, pedicellis ad 3 mm. longis, gracilibus, perianthio subcampanulato, flavescenti-viridescente, fragrante, lobis \pm oblongis non-nihil membranaceis pubescentibus, ± 1.9 mm. longis; staminibus ser. I & II ± 1.25 mm. longis, antheris filamentis aequalibus, ser. III ± 1.7 mm. longis, antheris leviter angustioribus, interdum 4-ocularibus; staminodiis nullis; gynaecio glabro ± 2.15 mm. longo, ovario ovoideo stylo aequali, stigmate parvo inconspicuo. Fructus immaturus(?) viridis, oblongus, 16×8 mm., cupula campanulata plus minusve verruculosa crasse 6-dentata glabra 6-7 mm. longa, 3 mm. lata, et 6 mm. diam. subtentus, pedicello incrassato glabro 3 (-5) cm. longo.

DISTRIBUTION: Panama, up to 2000 m. altitude.

PANAMA: Chiriquí: In shady moist habitat, Rio Chiriquí Viejo Valley, near El Volcán, just above the house near Colton's coffee finca, August 10, 1938, *P. White 225* (fl., TYPE, Mo) (tree 12-15 m. tall, 30-35 cm. in diam.; flowers yellowish green, fragrant); vicinity of Cerro Punta, *P. H. Allen 1570* (fr., Ch, GH, Mo) (tree 30 m.); rain-forest, Bajo Chorro, Boquete, *Davidson 435* (fr., A, Ch, Mo).

This species differs from the Costa Rican entity in having larger leaf-blades (up to 16 [-18] cm. long and up to 7.5 cm. broad) that are abruptly, obtusely, and shortly acuminate, with the reticulation on the lower surface only slightly prominent. The leaf-blades of *A. costaricensis* are usually not more than 12 (occasionally 13) cm. long and not more than 5 (occasionally 6) cm. broad. The apex is obtuse or rounded, very seldom abruptly and obtusely shortly acuminate, and the reticulation is strikingly conspicuous beneath.

The species is named for Dr. C. L. Lundell, who has contributed much to our knowledge of Central American Lauraceae.

8. *Aniba* Aublet

Aniba Aublet, Pl. Guian. 1: 327, 3: t. 126. 1775; Mez in Jahrb. Bot. Gart. Berlin 5: 50. 1889; Kostermans in Rec. Trav. Bot. Néerl. 35: 866. 1938 (Meded. Bot. Mus. Utrecht 48: 926. 1938).

Aydendron Nees & Martius in Linnaea 8: 36. 1833, p.p.; Nees, Syst. Laurin. 22, 245, 675. 1836; Meissner in DC. Prodr. 15¹: 88. 1864.

DISTRIBUTION: Tropical South America east of the Andes, principally, with one species in Mexico and two in the West Indies.

1. *Aniba mexicana* Kostermans in Rec. Trav. Bot. Néerl. 35: 926. 1938 (Meded. Bot. Mus. Utrecht 48: 926. 1938).

DISTRIBUTION: Known only from the type-collections, from Oaxaca.

MEXICO: Oaxaca: Cumbre de Teotalcingo, *Liebmann (Lauraceae 104)* (fr., SYNTYPE not seen); San Rafael (Cerro Espino), alt. 800 m., *Reko 3563* (fr., SYNTYPE, US).

I have seen only one syntype of this native Mexican tree of whose position in the genus Kostermans is uncertain. He describes it as having thick, somewhat angled branchlets, minutely pilose toward the apex, presently glabrescent, cylindrical branches cinereous, glabrous, and studded with frequent conspicuous lenticels, and yellowish-hirsute buds. The alternate

glabrous chartaceous leaf-blades are elliptic, 14–24 × 5–8 cm., the base acutish, the margin recurved and undulate, the apex distinctly acuminate, often abruptly so, the acumen verging toward caudate. Their upper surface is opaque, greenish, almost smooth, the costa prominent, the lateral nerves barely so, as well as the reticulation. The lower surface is, according to Kostermans, almost shining, densely prominulous-reticulate, the costa strongly prominent, and the lateral nerves 12–15 pairs, erect-spreading-arcuate, and prominent. The glabrous scarcely canaliculate petioles, 10–12 (–20) mm. long, are blackish in contrast to the gray branchlets. As yet the flowers have not been seen. The infructescence is a glabrous pyramidal subterminal panicle up to 5 cm. long. The fruit is ovoid-subglobose, truncate at the base, smooth, mucronulate, up to 12 mm. long and 10 mm. broad, subtended by a thickened, woody, hemispherical, subglobose cupule which is minutely verrucose, sparsely ferruginous-maculate, smooth-margined, measuring up to 15 mm. long, 17 mm. in diam., and 10 mm. deep. The pedicels are obconical, about 5 mm. long and 6 mm. in diameter at the apex.

Kostermans mentions that his species is near *Aniba citrifolia*, differing in form and texture of the leaves, but places it under "species incertae sedis." There can be no doubt, however, that this species is an *Aniba*. The simple margin of the cupule removes it from *Licaria*, and the woody cupule subtended by a short equally woody pedicel precludes the possibility of its belonging to *Endlicheria* or to *Aiouea*.

9. *Endlicheria* Nees¹

Endlicheria Nees in *Linnaea* 8: 37. 1833 (non Presl), *Syst. Laurin.* 365. 1836; Meissner in *DC Prodr.* 15¹: 172. 1864; Kostermans in *Meded. Bot. Mus. Utrecht* 25: 41. 1936, in *Rec. Trav. Bot. Néerl.* 34: 532. 1937 (*Meded. Bot. Mus. Utrecht* 42: 532. 1937).

DISTRIBUTION: Tropical Central and South America, as well as the West Indian Islands.

1. *Endlicheria Browniana* Mez in *Jahrb. Bot. Gart. Berlin* 5: 115. 1889; Kostermans in *Rec. Trav. Bot. Néerl.* 34: 532. 1937 (*Meded. Bot. Mus. Utrecht* 42: 532. 1937).
Aydendron macrophyllum Meissner in *DC. Prodr.* 15¹: 92. 1864.
Oreodaphne glomerata Seeman, *Fl. Panama* in *Bot. Voyage H.M.S. Herald* 193. 1854.

DISTRIBUTION: Known only from Panama.

PANAMA: Bocas del Toro: Fish Creek Mts., vicinity of Chiriquí Lagoon, *von Wedel* 2257 (♂ fl., Mo). Darién: Cape Corrientes, on the sea-coast, *Seemann* 1094, 1094 bis (♂, ♀, TYPE of *O. glomerata* not seen).

This single representative of the genus *Endlicheria* in Central America is a tree 20 m. high, with thick, subterete branchlets minutely yellowish-appressed-tomentellous, and with buds densely sericeous-tomentellous (or tomentose). The alternate coriaceous broadly elliptic acute, somewhat obtuse or shortly acuminate leaf-blades are 22–40 cm. long and 10–15 cm. wide, early silvery-sericeous, subtended by a stout obscurely canaliculate sulcate petiole that measures 1–2 cm. long and is densely sericeous-tomentellous. The upper surface of the leaves is green, glabrous, and shining, with prominent venation and coarse loose reticulation. The slightly arcuate

¹For complete synonymy and discussion of the name *Endlicheria*, see Kostermans in *Meded. Bot. Mus. Utrecht* 25: 41. 1936.

lateral nerves are 8 or 9 pairs. The lower surface, at first densely silvery-sericeous, later becomes more sparsely sericeous. The paniculate few-flowered sericeous-tomentellous inflorescence is axillary and up to 15 cm. long, with rather thick short peduncles, and with pedicels up to 2 mm. long. The ♀ flowers are pink, pilose, 2.5–3 mm. long, with an urceolate tube 1.5 mm. long, slightly constricted at the apex, and with the inner surface sericeous-tomentellous. The equal perianth-lobes are erect-spreading, fleshy, somewhat flat, narrowly ovate, acutish, 1.5 mm. long, with the inner surface tomentellous. The stamens are in 3 series, minute (0.75 mm. long), well developed, substerile. The anthers are ovate, acutish or truncate with the connective distinctly protruding beyond the small cells. The filaments are very short, broad, and densely pilose, with minute basal glands present on the third series. The ovary is very large, immersed in the perianth-tube, densely verruculose (sericeous-tomentellous), thickly ovoid, attenuate at the apex into a short style with a distinct discoid subtriangular stigma. The fruit is unknown, but the subtending cupule is subhemispherical, rather smooth, up to 11 mm. in diameter and 8 mm. high, merging into the obconical pedicel, which is 1 cm. long.

The von Wedel number certainly seems to be a staminate flowering specimen of this species. The locality is comparable, both being along the Atlantic sea-board. The leaves and branchlets are similar. The inflorescence unfortunately is past anthesis and the flowers are mostly unattached. However, one finds a flower cream-colored, according to the collector, which is infundibuliform, measuring about 3 mm. long, supported by a very slender pedicel up to 2.5 mm. long. The tube is slightly urceolate. The six equal perianth-lobes are thin, oblong, acutish, slightly pubescent without, and up to ± 1.7 mm. long. The two outer series of stamens are ± 0.8 mm. long, broadly ovate with an obtuse connective, sessile, the anther-cells located just above the middle of the anther seemingly introrse but with a tendency toward becoming lateral, their outer margins coinciding with the margin of the anther. The stamens of the inner series are ± 1 mm. long, ovate, but the apex almost narrowly truncate, the connective scarcely protruding, the extrorse sublateral cells located near the apex of the anther. The interior of the well-developed perianth-tube is so mucilaginous that it is difficult to separate the individual structures. No ovary or staminodia were seen.

10. *Cryptocarya* R. Brown

Cryptocarya R. Brown, Prodr. Fl. Nov. Holl. 1: 402. 1810; Nees in Wall. Pl. As. Rar. 2: 61, 69. 1831, Syst. Laurin. 192, 205. 1836; Meissner in DC. Prodr. 15¹: 68. 1864; Kostermans in Rec. Trav. Bot. Néerl. 34: 557. 1937 (Meded. Bot. Mus. Utrecht 42: 557. 1937) [footnote noting a motion pending conservation of *Cryptocarya*].

DISTRIBUTION: Tropics of both hemispheres, with less than a dozen known species in South America, Central America, and Mexico.

KEY TO THE SPECIES OF CRYPTO-CARYA

- A. Leaf-blades elliptic, obtusely acuminate, not longer than 12.5 cm., the base cuneate; lateral nerves up to 8 pairs; reticulation apparent throughout.....1. *C. Kostermansiana*.

A. Leaf-blades oblong, more or less sharply acuminate, the base cuneate or subcordate; lateral nerves up to 12 pairs; no reticulation apparent.....2. *C. Hintonii*.

1. *Cryptocarya Kostermansiana*, sp. nov.

Arbor 8 m. alta, ramulis fuscis angulatis pallide ferrugineo-tomentosis mox sparse pubescentibus. Folia alternata vel subopposita, petiolis gracilibus pubescentibus ad 1.5 cm. longis et 2 mm. latis, laminis juventute sparse pubescentibus, mox glabris, pergamentaceis, subcoriaceis fide coll., concoloribus, ellipticis, ad 12.5 cm. longis et 5 cm. latis, basi cuneatis apice leviter et obtuse subacuminatis, penninerviis, costa nervis lateralibus ad 8-paribus, supra obscuris subtus satis elevatis, rete venularum utrinque tenui. Inflorescentia axillaris, paniculata, ad 10 cm. longa, minute et sparse pubescens, pedunculo ad 4 cm. longo glabrescente. Flores ad 3 mm. longi, pedicellis brevibus 1 mm. vel minus longis pubescentibus, perianthio subcampanulato pallide viridescente pubescente, tubo urceolato, lobis ovatis plus minusve crassis, pubescentibus, marginibus hyalinis, ± 1.25 mm. longis; staminibus ser. I & II ± 0.8 mm. longis, antheris ovatis quam filamentis duplo longioribus, ser. III ± 1.25 mm. longis, biglandulosis, connectivo subtruncato auctis; staminodiis ovato-acuminatis sessilibus pubescentibus, ± 0.8 mm. longis; gynaecio glabro ad ± 1.9 mm. longo, ovario ovoideo stylo aequali, stigmatibus obtusis inconspicuis. Fructus ignotus.

DISTRIBUTION: Known only from the type-locality.

COSTA RICA: Alajuela: Naranjo, in reddish clay-loam on grave-site with nearly open exposure, alt. 1150 m., Feb. 24, 1940, *A. Smith P. 2418* (fl., TYPE, A) (tree 8 m., with trunk-base 30 cm., erect, the crown expanded, the bark light brown, finely granulate; leaves subcoriaceous, semi-rigid, dark green, opaque, glabrous, the venation rather faint; perianth campanulate, pale green, the pedicel and ovary bright green).

This species superficially resembles *Aiouea costaricensis*, but it is easily separated by the presence of staminodia and by the urceolate tube of the perianth. Although there is no doubt that this species belongs to the genus *Cryptocarya*, there is nothing very distinctive or characteristic about it as an entity. It is easily separable from the only other species from this region by the leaves. *Cryptocarya Hintonii* has definitely oblong leaf-blades much larger (to 20 cm.) and more or less cordate at the base.

The species is named for Dr. A. J. G. H. Kostermans, who has done more exhaustive work on the Lauraceae than any taxonomist of this century.

2. *Cryptocarya Hintonii*, sp. nov.

Arbor magna, ramulis rubescentibus leviter subpruinosis, mox fusciscentibus vel griseis, minute sed conspicue lenticellatis, rugosulis, glabris. Folia alternata, petiolis gracilibus glabris rubescentibus canaliculatis ad 1.5 cm. longis et 1.5 mm. latis, laminis utrinque glabris, leviter coriaceis, in sicco brunneis, oblongis, ad 20 cm. longis et 5 cm. latis, basi cuneatis vel saepe subcordatis, apice acuminatis, penninerviis, costa supra conspicue impressa, subtus crasse elevata, nervis lateralibus plus minusve 12-paribus, supra obscuris subtus obscurissimis, rete venularum utrinque obscuro. Inflorescentia ignota. Infructescentia nonnihil paulo incrassata, ad 8 cm. longa, rubescens, glaber. Fructus niger, lucidus, ellipticus, 22×16 cm., basi rotundatus, apice mucronatus, pedicello paulo incrassato rubescente ad 1 cm. longo, apice 2 mm. diam. expanso, insidens.

DISTRIBUTION: Known only from the type-locality.

MEXICO: Michoacán: Woods of Sierra Naranjillo, Coalcomán, alt. 1400 m.,

May 5, 1939, *Hinton 13737* (fr., TYPE, GH) (large tree; leaves poisonous to cattle?; flowers collected from same tree).

NATIVE NAME: "Ucaz."

This *Cryptocarya* from Mexico very distinctly recalls members of the genus found in the Pacific. Hinton speaks of flowers having been collected from the same tree. Unfortunately there were no flowers with the number at the Gray Herbarium. The habit and fruit bespeaks the genus *Cryptocarya*. Various characteristics easily separate the entity from the only other *Cryptocarya* from the area under study at the present time.

11. *Licaria* Aublet

Licaria Aublet, Pl. Guian. 1: 313, 3: t. 121. 1775; Kostermans in Meded. Bot. Mus. Utrecht 42: 575-604. 1937 (Rec. Trav. Bot. Néerl. 34: 575-604. 1937).

Misanteca Schlechtendal & Chamisso in Linnaea 6: 367. 1831.

Acrodiclidium Nees, Laur. Expos. 13. 1833; Kostermans in Meded. Bot. Mus. Utrecht 37: 719-754. 1936 (Rec. Trav. Bot. Néerl. 33: 719-754. 1936).

Chanekia Lundell in Phytologia 1: 177. 1937.

DISTRIBUTION: Mexico, Central and South America.

KEY TO THE SPECIES OF LICARIA

- A. Leaf-blades caudate-acuminate.
 - B. Leaf-blades 5-9.5 (-10.5) × 1.6-3.2 cm., lanceolate-oblong; petioles grayish-pubescent; inflorescences 2-3.5 cm. long; flowers white.....1. *L. caudata*.
 - B. Leaf-blades 8-12 × 3-4 cm., elliptic; petioles glabrous; inflorescences 5-11 cm. long; flowers red at the base, yellow at the apex.....2. *L. Cufodontisii*.
- A. Leaf-blades acuminate in varying degrees.
 - B. Largest leaf-blades not less than 14 cm. long.
 - C. Inflorescences not in heads.
 - D. Lower surface of leaf-blades, petioles, and branchlets not heavily and conspicuously tomentose.
 - E. Largest leaf-blades up to 25 cm. long.
 - F. Panicles rusty-tomentellous; petioles up to 23 mm. long.....3. *L. excelsa*.
 - F. Panicles glabrous; petioles not more than 20 mm. long.....4. *L. glaberrima*.
 - E. Largest leaf-blades not more than 15 cm. long.
 - F. Lateral nerves diverging from the costa at an angle of $\pm 35^\circ$; apex usually sharply acuminate.....5. *L. Pittieri*.
 - F. Lateral nerves diverging from the costa at an angle of $\pm 45^\circ$; apex usually not sharply acuminate.....6. *L. Cervantesii*.
 - D. Lower surface of leaf-blades, petioles, and branchlets heavily and conspicuously tomentose.....7. *L. Peckii*.
 - C. Inflorescences in heads.....8. *L. capitata*.
 - B. Largest leaf-blades not more than 12 cm. long.
 - C. Leaf-blades entirely glabrous, heavily coriaceous.....9. *L. coriacea*.
 - C. Leaf-blades pubescent beneath, more or less coriaceous.
 - D. Lower surface of leaf-blades and branchlets reddish brown-tomentose; petioles densely tomentose, 6 mm. long.....10. *L. mexicana*.
 - D. Lower surface of leaf-blades and branchlets appressed-whitish-sericeous, if at all pubescent; petioles finely minutely pubescent, usually 4-8 cm. long.....11. *L. campechiana*.
- A. Leaf-blades acute or obtuse.
 - B. Leaf-blades lanceolate (attenuate), not more than 2 cm. broad, coriaceous, the margin not crisped.....12. *L. lucida*.

B. Leaf-blades elliptic to (rarely) subobovate, up to 4.5 cm. broad, more or less chartaceous, the margin more or less crisped.....13. *L. misantlae*.

1. *Licaria caudata* (Lundell) Kostermans in Meded. Bot. Mus. Utrecht 42: 596. 1937 (Rec. Trav. Bot. Néerl. 34: 596. 1937).

Chanekia caudata Lundell in Phytologia 1: 178. 1937.

Acrodiclidium caudatum Lundell in Amer. Midl. Nat. 19: 428. 1938.

DISTRIBUTION: Forests of British Honduras, at an altitude of about 600 m., and adjoining Guatemala.

BRITISH HONDURAS: El Cayo: Arenal-Valentin road, in advanced forest, June-Aug. 1936, *Lundell 6183* (fl., ISOTYPE of *Chanekia caudata*, GH, NY) (tree 7 m., diam. 7.5 cm.; fls. white). Toledo: Camp 32, British Honduras-Guatemala Survey, *Schipp 1279* (fl., fr., A, GH, NY). GUATEMALA: Izabal: Bay of Santo Tomás, between Escobas and Santo Tomás, *Steyermark 39355* (fr., Ch); along Río Bonita, *Steyermark 41713* (fr., Ch).

This species is seemingly closely related to *Licaria Cufodontisii*, from Costa Rica, although the type of the latter is not available at present. The leaf-blades of *L. caudata*, however, usually measure less than 10×3.2 cm., are lanceolate-oblong, borne on petioles covered with a whitish pubescence, and the white-flowered inflorescences are never longer than 3.5 cm. On the other hand, the elliptic leaf-blades of *L. Cufodontisii* attain a length of 12 cm. and a width of 4 cm., and are borne on glabrous petioles, while the inflorescences are up to 11 cm. in length, bearing flowers which are red at the base and yellowish at the apex. The fruits of *L. caudata* are borne in cupules which measure about 4.5 mm. deep and flare about 1 cm. in diameter, the double margins being rather inconspicuous. The enlarged pedicel is up to 5 mm. long and increases from 1 mm. in diameter at the base to over 2 mm. at the apex. The cupule (to 7 mm. deep) of *L. Cufodontisii* is conspicuously though shallowly double-margined, the outer margin undulate. The cupule is subtended by a slender pedicel, enlarged to 3-4 mm. at the apex and up to 1 cm. long. Another superficial resemblance is noted between *L. caudata* and *L. coriacea* and is discussed under the latter species.

2. *Licaria Cufodontisii* Kostermans in Meded. Bot. Mus. Utrecht 42: 591. 1937 (Rec. Trav. Bot. Néerl. 34: 591. 1937).

Acrodiclidium Cufodontisii Lundell in Amer. Midl. Nat. 19: 428. 1938.

DISTRIBUTION: Costa Rica, known only from the vicinity of the type-locality.

COSTA RICA: Puntarenas: Peninsula Osa near Golfo Puerto Dulce, around Puerto Jimenez, on banks toward Sto. Domingo, *Cufodontis 187* (fl., TYPE not seen) (fl., Apr.); margins of tidal estuary between Puerto Jimenez and Sto. Domingo de Osa (Puerto Viejo), *Brenes 12262* (fl., Ch); Nicoya, *Tonduz 13863* (fr., GH).

Fructus ellipsoideus, in sicco nigrescens, cupula vadosa ad 8 mm. alta, 12 mm. diam., margine duplice et inconspicue valde proximo, exterior leviter undulato, interiore integro, pedicellis crassis, apice 3 mm., 1.5 cm. longis.

Kostermans remarks that this species is near *L. triandra*, from the West Indies, differing in form and texture of the leaves and floral characters. The following differences between these two species are noted. The leaf-blades of the West Indian species are ovate- (rarely) or lanceolate-elliptic, subtended by petioles 10-14 mm. long, whereas the leaf-blades of the Costa Rican species are elliptic, with petioles less than 8 mm. in length. The

pedicels of *L. triandra* are thickish, slightly pilose, becoming glabrous, 1.5 mm. long, as opposed to the slender, minutely and loosely cinereous-tomentellous pedicels, up to 3 mm. long, found in *L. Cufodontisii*. The flowering specimen of Brenes answers the description by Kostermans very well. The fruiting specimen differs only in the leaf-blades being more leathery and more robust. Both of these numbers show leaf-blades with a tendency toward an undulate margin. The fruit is ellipsoid, up to 12 mm. long, subtended by a shallow flaring cupule up to 8 mm. deep and to 12 mm. in diameter. The double margin is inconspicuous, the outer being only about 1 mm. lower than the upper and only slightly undulate. The pedicels are enlarged to 1.5 cm. long and 3 mm. broad at the apex.

Tonduz, on his label of no. 13863, states that this number represents the fruiting specimen of no. 13809, also from Nicoya. The latter is definitely a flowering specimen of *Ocotea veraguensis*. Its leaf-shape and venation, as well as its inflorescences, are entirely different from those of *Tonduz 13863*.

3. *Licaria excelsa* Kostermans in Meded. Bot. Mus. Utrecht 42: 595. 1937 (Rec. Trav. Bot. Néerl. 34: 595. 1937).

Acroclidium excelsum Lundell in Amer. Midl. Nat. 19: 428. 1938.

DISTRIBUTION: Panama and adjacent Costa Rica.

COSTA RICA: Alajuela: Cataracts of San Ramón, *Brenes 13523* (fl., Ch). PANAMA: Chiriquí: Southern slope of the mountain in moist forest, Cerro de la Horqueta, near castle of Las Siguas, in 1911, *Pittier 3200* (fr., ISOTYPE, Ch) (large tree); rain-forest of Bajo Chorro, Boquete, *Davidson 361* (fr., Ch).

NATIVE NAME: "Siguatón" (Panama).

This is one of the largest-leaved species to be found in Mexico and Central America. A large tree, the branchlets are thick, glabrous, almost shining, borne on smooth gray branches; the rigidly coriaceous leaf-blades also are glabrous and almost shining, elliptic, 20 (-24) × 5.5 (-8) cm., acuminate and shortly acute at the base. The stout glabrous petiole measures up to 23 mm. long. The axillary panicle, densely ferruginous-sericeous-tomentellous before anthesis, lengthens in fruit to 15 cm. and becomes glabrous. The fruit is smooth, ellipsoid-ovoid, subtended by a cupule almost hemispheric-cylindrical, 20 mm. high, 25 mm. in diameter, and 16 mm. deep, with an obscurely double margin. The outer margin is entire and thickened, the inner, extending less than 2 mm. above the outer, is thinner, exhibiting a tendency at intervals to split toward the base. The pedicels become enlarged up to 15 mm. long and 10 mm. diameter at the apex.

4. *Licaria glaberrima* (Lundell), comb. nov.

Acroclidium glaberrimum Lundell in Lloydia 4: 46. 1941.

DISTRIBUTION: Mexico, known only from the type-locality.

MEXICO: Chiapas: Volcán de Tacaná, on north side, alt. 2100 m., April 2, 1939, *Matuda 2981* (fl., TYPE, Mich).

The complete glabrosity, coupled with just about the largest leaves known for the genus in this area, immediately sets this species apart. The coriaceous elliptic leaf-blades measure over 25 cm. long and up to 10 cm. broad, are acuminate, almost shining above and densely and very conspicuously reticulate beneath. The costa and lateral nerves are comparatively incon-

spicuous above, being either flush with the surface or slightly impressed. On the lower surface they are elevated and exceedingly prominent. The sturdy petioles, up to 2 cm. long, as well as the striate shining branchlets, are dark brown. No close affinity of this species has been discovered thus far.

5. *Licaria Pittieri* (Mez), comb. nov.

Misanteca Pittieri Mez in Bull. Herb. Boiss. II: 3: 230. 1903; Standley in Field Mus. Publ. Bot. 18: 452. 1937.

Misanteca costaricensis Johnston in Contr. Gray Herb. n. s. 70: 70. 1924.

DISTRIBUTION: Known only from Costa Rica.

COSTA RICA: Alajuela: Hills of San Pedro de San Ramón, *Brenes* 5023, 5489 (fr., Ch); hills of Santiago, near San Ramón, alt. 1100 m., June 1, 1901, *Brenes* 14403 (fl., type of *M. costaricensis*, GH) (tree 8–10 m.); woods above San Ramón, *Tonduz* 17589 (fr., US). San José: Vicinity of Zapote, *Standley* 40238 (fr., US); Santa María, *Stork* 2332 (fl., Ch); Hacienda Belmira, near Santa María, alt. 1450 m., Jan. 1898, *Tonduz* 11612 (fr., ISOTYPE of *M. Pittieri*, GH, US).

NATIVE NAME: "Quizarrá" (Costa Rica).

Kostermans includes both *M. costaricensis* and *M. Pittieri* under *Licaria limbosa*, a South American species. Although there is no specimen of the latter at hand, the fairly accurate drawing of *Laurus limbosa*, its basis, in Ruiz & Pavon, Flora Peruviana Laurographia, plate 361, shows the species to have a cupule with a less markedly double edge than the cupule of *L. Pittieri*. Also, the lateral nerves of the South American species are more arcuate than those of the Costa Rican specimens. The inflorescence of our species differs from that of *L. limbosa*, the axillary panicles of the latter ranging from 4 to 7 cm. in length. The distinctly subterminal panicles of *L. Pittieri* measure about 15 cm. long and 6–12 cm. broad.

6. *Licaria Cervantesii* (H.B.K.) Kostermans in Meded. Bot. Mus. Utrecht 42: 587. 1937 (Rec. Trav. Bot. Néerl. 34: 587. 1937).

Laurus Cervantesii H.B.K. Nov. Gen. & Sp. 2: 134 [169]. 1817.

Misanteca Juergensenii Mez in Jahrb. Bot. Gart. Berlin 5: 102. 1889; Standley in Contr. U. S. Nat. Herb. 23: 292. 1922.

Acroclidium Cervantesii Lundell in Amer. Midl. Nat. 19: 428. 1938.

DISTRIBUTION: Southern Mexico, along the coast, Guatemala, and British Honduras, at 250–750 m. altitude.

MEXICO: Guerrero: In mountains near Masatlán (Mazatlán), alt. 990 m., *Humboldt & Bonpland* (fr., photo. of TYPE of *Laurus Cervantesii*, Ch, NY); near Chilpancingo, Las Cajones, Acapulco, *Gamon* 22 (fr., Y); Montes de Oca, Vallecitos, *Hinton* 10194 (fl., fr.), 10273 (fr.), 10290 (fl.), 10291 (fr., GH). Oaxaca: Near Pinotepa, *Juergensen* 176, 177 (syntypes of *Misanteca Juergensenii* not seen); Chinantla, Choapán, *Galeotti* 260 (fl., fr., isosytype of *Misanteca Juergensenii*, US); Juquila, Río Mapache, near Tepenixtlahuaca, *Conzatti* 4366 (fr., US); Pochutla, Magdalena, *Conzatti, Reko & Makrinus* 3205 (fr., GH); from Río Verde to Panixtlahuaca, *Nelson* 2383 (fr., Ch); between Juquila and Nopala, *Nelson* 2412 (fr., Ch). GUATEMALA: Alta Verapaz: Matacui, *J. D. Smith* 1650 (fl., fr., US); near Tucurú, *Standley* 70718 (fr., Ch). BRITISH HONDURAS: Belize: Belize River, *Record B.H.* 51 (*Y* 8819) (fr., NY, Y).

NATIVE NAMES: "Aguacatillo" (Guerrero); "Ahuacatillo" (Oaxaca).

Kostermans states that this species is very difficult to distinguish from *L. limbosa* of South America, the only difference being the free glands of the

flower. Since he included *Misanteca costaricensis* and *M. Pittieri* (in my opinion a single species) under *L. limbosa*, it is sufficient at this time to mention the points of difference between *L. Cervantesii* and the Costa Rican entity. As one may note, the latter has a longer and a subterminal inflorescence as opposed to the short axillary panicles of *L. Cervantesii*. The Costa Rican species shows leaf-blades with the apex sharply acuminate and with lateral nerves diverging at an angle of about 34° , as opposed to the more broadly acuminate apex and nerves diverging at an angle of about 45° to be found in the leaf-blades of *L. Cervantesii*. The cupule of the latter species is on the whole more shallow (1 cm. long) and the entire inner margin often extends about 5 mm. above the outer deeply lobed margin. In the case of *L. Pittieri*, the cupule measures nearly 1.5 cm. long and the inner margin is about 2 mm. higher than the outer shallowly lobed margin. At maturity the exposed portion of the fruit of *L. Cervantesii* is longer than the subtending cupule, whereas the exposed portion of the fruit of *L. Pittieri* equals or measures less than the length of the cupule.

7. *Licaria Peckii* (Johnston) Kostermans in Meded. Bot. Mus. Utrecht 42: 597. 1937 (Rec. Trav. Bot. Néerl. 34: 597. 1937).

Misanteca Peckii Johnston in Contr. Gray Herb. n.s. 70: 70. 1924.

Chanekia Peckii Lundell in Phytologia I: 178. 1937.

Acrodiclidium Peckii Lundell in Amer. Midl. Nat. 19: 428. 1938.

DISTRIBUTION: Guatemala and British Honduras.

GUATEMALA: Petén: La Libertad and vicinity, *Aguilar* 242 (fl., A, NY); Uaxactún, *Bartlett* 12214 (fl., fr., A, NY, US), 12236 (fr., NY, US), 12550 (fl., NY, US); Carmelita, 1 m. south of village, on trail to Flores, *Egler* 42-223 (fr., Ch); Chimah, *Lundell* 3435 (fr., A, Ch); Cerro Ceibal (Chorro Ceibal or Cerro San Martín), between mouth of Río Santa Mónica and mouth of Río San Martín, on left side of Río Cancuen (west side of river going downstream), *Steyermark* 46059 (fr., Ch); 46134 (fl., Ch). Alta Verapaz: La Tinta, *Maxon & Hay* 3346 (fr., NY); woods between Finca Cubilgüitz and Hacienda Yaxcabanal, *Steyermark* 44836 (fr., Ch); savanna north of Concepción, 3-5 miles southeast of Finca Yalpemech, near Alta Verapaz-Petén boundary line, *Steyermark* 45236 (fr., Ch); vicinity of Finca Yalpemech, near Alta Verapaz-Petén boundary line, *Steyermark* 45295 (fl., Ch). Izabal: Open slopes, vicinity of Quiriguá, *Standley* 23764 (fl., NY); Río Dulce, between Livingston and 6 miles up river, on north side (right hand side going up river), *Steyermark* 39406 (fl., Ch); Río Dulce, 2-4 miles west of Livingston, on south side (left hand side going up river), *Steyermark* 39556 (fl., fr., Ch). BRITISH HONDURAS: Without locality, in 1905-07, *M. E. Peck* 826 (fl., fr., TYPE of *M. Peckii* not seen). El Cayo: El Cayo and vicinity, *Chanek* 140 (fl., Ch); Vaca, *Gentle* 2341 (fr., A); Retiro, *Lundell* 6315 (fr., GH, NY). Stann Creek: Freshwater Creek Reserve, *Pelly* 2, 26 (*Y.* 23716) (fr., Ch), *Stevenson* V (fr., Ch).

NATIVE NAME: "Senk-cul" (Guatemala).

Licaria Peckii is truly one of the most striking species of the family in Central America. The chartaceous, oblong, obovate-oblong, or sometimes elliptic leaf-blades show the midrib and lateral nerves deeply impressed above (with no noticeable reticulation), and elevated and pubescent beneath. The loose few-flowered racemose inflorescences with long peduncles stand out because of their thick covering of light brownish villous-hirsute pubescence. The same pubescence persists on the young branchlets also. The flowers themselves are unusual in being depressed, broad, and rather

fleshy. The fruiting pedicel is more slender than is usually the case in the genus and the double-margined cupule is thinner and comparatively smooth on the outer surface.

8. *Licaria capitata* (Schlechtendal & Chamisso) Kostermans in Meded. Bot. Mus. Utrecht 42: 592, fig. 5. 1937 (Rec. Trav. Bot. Néerl. 34: 592. 1937).

Misanteca capitata Schlechtendal & Chamisso in Linnaea 6: 367. 1831; Standley in Contr. U. S. Nat. Herb. 23: 292. 1922, in Trop. Woods 21: 17. 1930, in Field Mus. Publ. Bot. 10: 200. 1931; Standley & Record in Field Mus. Publ. Bot. 12: 142. 1936; Yuncker in Field Mus. Publ. Bot. 9: 290. 1940.

Acrodiclidium glabrum Brandegee in Univ. Calif. Publ. Bot. 6: 497. 1919.

Acrodiclidium capitatum Lundell in Amer. Midl. Nat. 19: 428. 1938.

DISTRIBUTION: Southern Mexico, Guatemala, Honduras, and British Honduras.

MEXICO: Without locality, *Kerber* 410 (fl., US). San Luis Potosí: Tamazunchale, *C.L. & A.A. Lundell* 7129 (fr., NY). Vera Cruz: Huasteca, Wartenberg, near Tantoyuca, *Ervendberg* 375 (fl., fr., GH); Jicaltepec, *Liebmann (Lauraceae 107)* (fr., US); Taso del Correo ad Río Tecoluta, *Liebmann* 730 (*Lauraceae 111*) (fr., GH); Barranca de Tenampa, Zacuapán, Sept. 1906, *Purpus* 2068 (fr., isosytype of *Acrodiclidium glabrum*, GH, NY, US), *Purpus* 2354 (fl., GH, NY, US); Corral de Piedras, *Purpus* 7802 (fl., fr., A, GH, NY, US), *Purpus* 8096 (sytype of *Acrodiclidium glabrum* not seen), *Purpus* 8143 (fr., isosytype of *Acrodiclidium glabrum*, GH, NY), *Purpus* 12050 (fr., A, NY); Misantla, *Schiede & Deppe* 1148 (fl., fr., TYPE of *Misanteca capitata* not seen). Oaxaca: Between San Carlos and Pantanillo, Cordillera Centro-occidental, *Liebmann (Lauraceae 10)* (fr., US), *Liebmann* 729 (*Lauraceae 110*) (sterile, US); Tuxtepec, Chiltepec and vicinity, *Martínez-Calderón* 123, 555 (fr., A). GUATEMALA: Alta Verapaz: Cubilgüitz, *von Tuerckheim (J.D.Smith 7885)* (fl., fr., GH, NY, US), 4085 (fl., US). HONDURAS: Atlántida: Vicinity of Tela, *Standley* 54729 (fr., A, US); Lancetilla Valley, near Tela, *Standley* 55798 (sterile, A, US); vicinity of La Ceiba, along Danto River, slopes of Mt. Cangrejal, *Yuncker, Koepfer & Wagner* 8716 (fr., GH, NY, US). Yoro: Sierra de Sulaco, *C. & V. W. von Hagen* 1032 (sterile, NY); Pijol, Subirana, *C. & V. W. von Hagen* 1327 (sterile, NY). BRITISH HONDURAS: El Cayo: Vaca, *Gentle* 2412 (fl., A); Valentin, Camp 6, *Lundell* 6408 (fr., GH, NY, US), 6539 (fr., GH, NY); Chalillo Crossing-Cohune Ridge Road, *Lundell* 6551 (sterile, NY). Toledo: *Peck* 802 (fl., GH); "Eldorado," Punta Gorda, *Schipp* 990 (fr., A, GH, NY).

NATIVE NAMES: "Laurel," "Palo misanteco" (Vera Cruz); "Laurel de la Sierra" (Oaxaca); "Aguacatillo" (Honduras).

Probably the best known and most easily recognized species in the genus is *Licaria capitata*. Whether in flower or in fruit the long-pedunculate compact heads are distinctive. The very large (up to 25 × 10 cm.) elliptic acuminate leaf-blades are heavily coriaceous, usually more or less obscurely reticulate and shining above.

9. *Licaria coriacea* (Lundell) Kostermans in Meded. Bot. Mus. Utrecht 42: 604. 1937 (Rec. Trav. Bot. Néerl. 34: 604. 1937).

Chanekia coriacea Lundell in Phytologia 1: 179. 1937.

DISTRIBUTION: In mountains and along river-banks of eastern Guatemala and western British Honduras.

GUATEMALA: Izabal: Bank of Río Dulce, *C.L. Wilson* 376 (fl., Ch); along Río Dulce below junction with Río Tameja, *Steyermark* 42015 (fl., Ch). Zacapa: Between Cerro de Monos and upper slopes of Monte Vergin, *Steyermark* 42872 (fl., Ch). BRITISH HONDURAS: Toledo: Camp 31, British Honduras-Guatemala Survey, occasional in shady valley, also on hilltop in open places, alt. 630 m., Feb. 22, 1934, *Schipp* 1282 (fr., ISOTYPE of *Chanekia coriacea*, A, GH, NY) (small tree 9 m., 22.5 cm. in diam.; flowers white; fruits black with red pedicels).

Kostermans, with only fruiting material at hand, identified this species with *L. triandra* of the West Indies; but he felt sure that it is a different entity because of its locality. If we may ignore the difference occasioned by the extremely coriaceous texture of the leaf-blades and a more acuminate rather than caudate-acuminate apex, there is apparent a striking similarity between this species and *L. caudata*, both described from approximately the same locality. *Schipp 1279*, cited by Lundell under *Chanekia caudata*, was collected very near the type-number of *L. coriacea*. The reticulation and venation of the leaf-blades of the two species is similar, as well as the bark of the branchlets. However, there is attached to the Gray Herbarium sheet of *L. caudata* (no. 1279) an old fruit which definitely separates this species from *L. coriacea*. The fruit of the latter is ellipsoid, about 1.7×1.2 cm., abruptly short-apiculate, subtended by a shallow accrescent obviously double-margined verrucose cupule, 1.6–2.3 cm. in diam. and 1 cm. long, borne on a thick short peduncle not more than 3 cm. long, according to Lundell. The peduncles of the fruit on the Gray and Arnold specimens are not more than 1 cm. long. The old fruit of *L. caudata* is ellipsoid-ovoid and apiculate, 8–10 cm., subtended by a flat shallow slightly double-margined cupule, about 9 mm. in diam. and 2–3 mm. long, borne on a very slender, branched peduncle about 2 cm. long and 0.5 mm. thick.

10. *Licaria mexicana* (Brandegge) Kostermans in Meded. Bot. Mus. Utrecht 42: 599. 1937 (Rec. Trav. Bot. Néerl. 34: 599. 1937).

Acrodictidium mexicanum Brandegge in Univ. Calif. Publ. Bot. 6: 497. 1919.

Chanekia mexicana Lundell in Phytologia 1: 181. 1937.

DISTRIBUTION: Known only from type-locality, and vicinity, in Mexico.

MEXICO: Vera Cruz: Zacuapán and vicinity, Nov. 1906, *Purpus 2293* (fr., Ch, GH); near Tlacoquintla, June 1917, *8081* (fl., ISOTYPE of *A. mexicanum*, A, Ch, GH), *8164* (fl., GH, NY, US), *8430* (fl., GH, NY, US), *8781* (fr., GH), *14335* (fl., fr., A).

The reddish brown tomentum clothing the lower leaf-surface, petioles, branchlets, and long peduncles of the inflorescence offers a good diagnostic character for the species. The branchlets are densely foliose. The small (8×2.5 cm.) oblong or elliptic leaf-blades are shortly petioled, and the slender paniculate inflorescences (about 7 cm. long and less than 1.5 cm. broad) are supported by long peduncles nearly 5 cm. in length. The fruit is subtended by a cupule whose margins approximate each other. The outer thickened and slightly undulating margin is usually shorter than the thin and entire inner margin.

11. *Licaria campechiana* (Standley) Kostermans in Meded. Bot. Mus. Utrecht 42: 599. 1937 (Rec. Trav. Bot. Néerl. 34: 599. 1937).

Phoebe campechiana Standley ex Lundell in Carnegie Inst. Wash. Publ. 436: 312. 1934, nomen nudum.

Ocotea campechiana Standley in Carnegie Inst. Wash. Publ. 461: 56. 1935; Standley & Record in Field Mus. Publ. Bot. 12: 143. 1936.

Misanteca campechiana Lundell in Carnegie Inst. Wash. Publ. 478: 209. 1937.

Chanekia campechiana Lundell in Phytologia 1: 178. 1937.

Acrodictidium campechiana Lundell in Amer. Midl. Nat. 19: 428. 1938.

DISTRIBUTION: Mexico, Guatemala, and British Honduras.

MEXICO: Campeche: Tuxpeña, Feb. 6, 1932, *Lundell 1295* (fl., ISOTYPE of

Ocotea campechiana, GH, NY) (large tree), *Lundell 1380* (fl., Ch, GH, NY). GUATEMALA: Petén: La Libertad, *Lundell 3065* (fl., A), *3359* (fl., Ch, GH), *3409* (fl., Ch); Uaxactún, *Bartlett 12339* (fl., A, NY, US). BRITISH HONDURAS: Orange Walk: Indian Church, New River Lagoon, *C.S. Brown 31* (*Y 13682*) (fr., Ch, Y).

NATIVE NAMES: "Laurelillo" (Campeche); "Ektil," "Dzol," "Copal-chi" (Guatemala).

Licaria campechiana is striking for its appearance of extreme glabrosity. Careful examination, however, reveals closely appressed whitish-sericeous pubescence on the lower leaf-surface, petioles, and branchlets. The leaf-blades are lanceolate, more or less attenuately acuminate, coriaceous, with a midrib impressed above and very prominent beneath, and with obscure venation. The rather rigid, somewhat racemose-paniculate inflorescences are usually not longer than 2.5 cm., although occasionally they reach a length of 5 cm., of which the peduncle measures approximately one-half. I have not seen a fruit of this species but the cupule is about 1 cm. deep and 1.3 cm. in diameter, inconspicuously double-margined, and of rather thin texture. The enlarged pedicel measures nearly 2 mm. long and is about the same width at the apex.

12. *Licaria lucida* (Lundell), comb. nov.

Acroclidium lucidum Lundell in Contr. Univ. Mich. Herb. 7: 12. 1942.

DISTRIBUTION: Known only from the type-locality.

MEXICO: Chiapas: Santa Rosa, near Escuintla, in advanced forest, alt. 1600 m., June 20, 1941, *Matuda 4239* (fr., A, TYPE — Mich, NY) (tree 10 m.).

Although no flowering collection has been made to date, the linear-lanceolate, acute to obtuse, shining, entirely glabrous leaves mark this species as differing from all other Mexican species. The nearest relative presumably is *L. campechiana*, from which it differs in its complete glabrosity and long-acute to obtuse rather than acuminate leaves. The fruit is small, ellipsoid-ovoid, 1 cm. long and ± 8 mm. wide, subtended by a thickened more or less flaring lobed cupule ± 1.5 –2 cm. in diameter, ± 1.5 cm. long, and ± 0.5 cm. deep, seated on a pedicel about 4 mm. long and 2 mm. thick. Unlike the majority of fruits in this genus, that of *L. lucida* shows, in the dried state, the inner margin 5 mm. or less shorter than the thickened prominently lobed outer margin. The usual situation in the genus shows the outer margin reversed and undulating, exposing the inner margin rather than protruding beyond it. It is possible that this is due to the conditions under which the individual specimen was prepared. Further material will verify this. So far, there is no other specimen which matches the type.

13. *Licaria misantlae* (Brandegge) Kostermans in Meded. Bot. Mus. Utrecht 42: 602. 1937 (Rec. Trav. Bot. Néerl. 34: 602. 1937).

Acroclidium misantlae Brandegge in Univ. Calif. Publ. Bot. 6: 497. 1919.

Chanekia misantlae Lundell in Phytologia 1: 180. 1937.

DISTRIBUTION: Known only from the type-locality, and vicinity, in Mexico.

MEXICO: Vera Cruz: Near Misantla, *Purpus 8145* (fl., ISOTYPE of *A. misantlae*, GH, NY); Acasonica, August, 1919, *Purpus 8433* (fl., GH, NY).

This species is unique among the Mexican and Central American *Licariae* in having elliptic or obovate leaves, usually acute, obtuse or sometimes retuse, with crisped margins. Unusual too is the very coarse reticulation

apparent on both surfaces of the leaves. No fruit is known for the species. The nearest resemblance superficially is found in *Ocotea veraguensis*, which, strangely enough, has double-margined cupules similar to those found in *Licaria*. The flowers, however, show unmistakably the *Ocotea* structure.

12. *Cassytha* Linnaeus

Cassytha Linnaeus, Sp. Pl. 35. 1753; Nees, Syst. Laurin. 641. 1836; Meissner in DC. Prodr. 15¹: 252. 1864; Bentham & Hooker, Gen. Pl. 3: 164. 1880; Hemsley, Biol. Centr. Am. Bot. 3: 77. 1882; Mez in Jahrb. Bot. Gart. Berlin 5: 489. 1889.

1. *Cassytha filiformis* Jacquin, Sel. Stirp. Amer. 115, t. 79. 1763, et Pict. t. 116. 1780, et Am. Gew. 2: 133. 1786; Standley in Field Mus. Publ. Bot. 10: 202. 1931; Standley & Record in op. cit. 12: 142. 1936; Standley in op. cit. 18: 450. 1937.

Cassytha americana Nees, Syst. Laurin. 644. 1836.

DISTRIBUTION: Tropics of the world, but not common in Central America.

This parasitic herb is unique in the family. In habit and general appearance it is similar to *Cuscuta*, of the Convolvulaceae, being yellowish throughout, with its leaves reduced to scales. The floral structure, however, is typically lauraceous.

ASIATIC SPECIES CULTIVATED IN TROPICAL AMERICA

Cinnamomum (L.) Nees & Ebermaier

Cinnamomum Camphora (L.) Nees & Ebermaier, Handb. Med. Pharm. Bot. 2: 430. 1831; Meissner in DC. Prodr. 15¹: 24. 1864; Standley in Contr. U. S. Nat. Herb. 27: 183. 1928; Standley & Calderón, Lista Prelim. Pl. Salvador 84. 1925; Standley in Field Mus. Publ. Bot. 18: 451. 1937.

DISTRIBUTION: Tropical Asia and Malaya. Cultivated in tropics throughout the world. Source of commercial camphor and also planted for ornamental purposes.

NATIVE NAME: "Alcanfor."

Cinnamomum zeylanicum Nees in Wallich, Pl. As. Rar. 2: 74. 1831; Standley in Contr. U. S. Nat. Herb. 27: 183. 1928; Standley & Calderón, Lista Prelim. Pl. Salvador 84. 1925; Standley in Field Mus. Publ. Bot. 18: 451. 1937.

DISTRIBUTION: India and Malaya. Cultivated in tropics throughout the world. Source of commercial cinnamon and also planted for ornamental purposes.

NATIVE NAME: "Canela."

ADDENDA

Since the preceding was set in type, Dr. W. A. Dayton, of the U. S. Department of Agriculture Forest Service (USFS), has kindly made available to me additional material from Panama, as well as more complete and corrected data for material already cited. Some of these specimens are cited in the following notes. Also, Dr. I. M. Johnston has since made a supplementary collection in Panama, including a new species which is described below.

15. *Persea rigens* Allen in Jour. Arnold Arb. 26: 297. 1945.

Little 6075, cited from Costa Rica, is actually from Panama. Very probably the species occurs in Costa Rica, but to date it has not been collected in that area.

PANAMA: Chiriquí: Near sawmill on Río Chiriquí Viejo, 3 km. n. of Camp El

Volcán, *Little* 6057 (sterile, USFS), 6058 (fl., USFS), alt. 1310 m., March 5, 1943, 6075 (fl., TYPE-Ch, USFS) (tree 27 m.; "Pizarrá").

11a. *Phoebe Johnstonii*, sp. nov.

Arbor aromatica parva ad 15 m. alta, ramulis griseo-subsericeis mox glabrescentibus deinde glabris striatis rubescentibus. Folia alternata, petiolis pubescentibus mox glabris gracilibus canaliculatis rubescentibus ad 1.5 cm. longis; laminis glabris, subtus nervis et glandulis axillaribus exceptis, juventute membranaceis mox pergamentaceis, in sicco supra nitidis et olivaceo-viridescentibus, subtus pallidis, lanceolato-ellipticis, 8–14.5 cm. longis et 2.5–4.5 cm. latis, basi infima anguste cuneatis vel attenuate cuneatis, apice obtuse et attenuate acuminatis vel subcaudato-acuminatis, subtriplinerviis, costa pallide rubescente supra impressa subtus elevata, nervis lateralibus pallide rubescentibus 4–5-paribus, infimis conspicuis angulo 25–35° divergentibus, glandulis axillaribus conspicuis, superioribus obscurioribus angulo 45° divergentibus, glandulis axillaribus obscuris, rete venularum satis obscuro. Inflorescentia axillaris et subterminalis, multi-racemoso-paniculata vel raro late paniculata, ad 12 cm. longa, juventute flavo-albescens, deinde rubescens, pedunculo ad 2 cm. longo striato pubescente vel glabrescente. Flores ad 6 mm. longi, pedicellis ad 3 mm. longis, perianthio subcampanulato pallide flavo, lobis ovato-ellipticis vel elliptico-lanceolatis, membranaceis, subaequalibus, ± 2.35 –3 mm. longis pubescentibus; staminibus ser. I & II ± 1.7 mm. longis, antheris ovatis filamentis aequalibus, ser. III ± 2.15 mm. longis, antheris subovatis emarginatis biglandulosis, glandulis subsessilibus conspicuis reniformibus staminodiis subcordatis ovatis stipitatis, ± 1.15 mm. longis; gynaecio glabro ± 2.5 mm. longo, ovario ovoideo vel subgloboso stylo gracili subaequali, stigmate subcapitato satis conspicuo. Fructus ellipsoideus, glaber, viridis fide coll., minute apiculatus, 1 cm. longus et 7 mm. latus, cupula 5 mm. longa, 7 mm. diam., et 4 mm. alta perianthii lobis leviter incrassatis rubescentibus, fide coll., persistentibus coronata subtentus, pedicello incrassato rubescente ad 6 mm. longo.

DISTRIBUTION: Known only from the Canal Zone, Panama, at an altitude up to 80 m., and San José Island, in thickets and at edge of forest.

PANAMA: Canal Zone: Hospital grounds at Ancon, *Pittier* 2750 (fl., GH). San José Island: (Perlas Archipelago, Gulf of Panama, about 55 miles SSE. of Balboa): *Johnston* 505 (fr., A), 512 (fr., A), 553 (fl., fr., A), 583 (fr., A), 666 (fl., fr., A), 667 (fl., fr., A), M-area Road, April 11, 1945, 697 (fl., fr., TYPE, A) (tree 7.5 m. high, in thicket; flowers yellowish; fruit green, the cupule and pedicel reddish), 713 (fl., fr., A), 773 (fl., fr., A).

This species is most closely related to *Phoebe mexicana* and to *P. Ehrenbergii*. It is readily separated from the former by its shorter panicles, with flowers that are never whitish gray-pubescent, and by leaf-blades that are thinner in texture and on the whole more narrow. From the latter it may be distinguished by the many-flowered inflorescences usually not more than 8 cm. long, with flowers not more than 4 mm. long and never pruinose.

The position of this species may be indicated by the following revision of the original key occurring at the top of page 305:

- D. Inflorescence composed of numerous subterminal and axillary spike-like racemose panicles up to 15 cm. long.
 E. Panicles up to 15 cm. long; flowers usually whitish gray-pubescent.....
11. *P. mexicana*.

- E. Panicles usually less than 12 cm. long; flowers not whitish gray-pubescent.....11a. *P. Johnstonii*.
- D. Inflorescence composed of axillary and subterminal short loose few- to many-flowered panicles less than 10 cm. long and more or less glabrous.
- E. Largest leaf-blades not more than 15 cm. long; lowermost pair of lateral nerves not conspicuous above the middle of the blade and less stout than the costa.
- F. Inflorescence many-flowered, not more than 8 (rarely 12) cm. long; flowers not pruinose and not more than 4 mm. long.....11a. *P. Johnstonii*.
- F. Inflorescence few-flowered, up to 12 cm. long; flowers pruinose and nearly 5 mm. long.....12. *P. Ehrenbergii*.
- E. Largest leaf-blades 18–20 cm. long; lowermost pair of lateral nerves conspicuous $\frac{2}{3}$ to $\frac{3}{4}$ the length of the blade and as stout as the costa..
.....13. *P. neurophylla*.
22. *Ocotea rubrinervis* Mez; Allen in Jour. Arnold Arb. 26: 353. 1945.

The nine Johnston numbers cited as “in mixed forest along South Road (S² area),” actually were collected in various areas on San José Island.

31. *Nectandra Whitei* (Woodson) Allen in Jour. Arnold Arb. 26: 398. 1945.

Little 6059, cited as from Costa Rica, actually was collected in Panama.

PANAMA: Chiriquí: Vicinity of Camp El Volcán, *Little 6047* (fl., USFS), *6056* (young fr., USFS), *6059* (young fr., Ch, USFS), *6062*, *6069* (young fr., USFS).

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